Taoist Tai Chi™: Patterns of Practice and Perceptions of its Effects on the Health and Well-Being of Western Australian Practitioners

By

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This thesis is presented for the degree of Doctor of Philosophy of Murdoch University

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Declaration

I declare that this thesis is my own account of my research and contains as its main content work which has not previously been submitted for a degree at any tertiary education institution.

Li Wei

Signature.....

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Tai Chi in the park with my Western family

Abstract

Background: Tai Chi (TC) is a traditional Chinese martial art that has been adapted for use in Western societies as a means of improving people's health. However, little is known regarding the characteristics of people who undertake TC, why they take it up and continue to participate, and how they perceive its effects on their health and well-being.

Aims: This study investigated the patterns of use of Taoist Tai Chi™ (TTC) in Western Australia (WA) and the characteristics held by its practitioners, including their demographics, health status, expectations, health locus of control (HLC), motivations and barriers to practise, in addition to their perceptions of the effect of TTC on their health and well-being.

Methodology: A cross-sectional survey questionnaire was designed to collect qualitative and quantitative data from a randomly chosen sample of 696 TTC practitioners who were registered members of the International Taoist Tai Chi™ Society of WA. A response rate of 54.9% (n = 382) was obtained and parametric and non-parametric tests were conducted to analyse descriptive data. In addition, exploratory factor analysis was used to analyse participants' beliefs regarding the efficacy of TTC, while regression analysis was conducted on HLC data. All *p* levels lower than .05 were considered significant. Qualitative data regarding participants' expectations of TTC and perceptions of its effect on health and well-being were analysed using content analysis.

Results: The majority of TTC practitioners were older Australians with a Caucasian background, female, retired, well-educated, and living in metropolitan areas. The 108 movement Yang-style TTC was practised most commonly in morning classes, twice per week for a period of 60 to 90 minutes per session in TTC clubs with other TTC practitioners. The majority had commenced TTC in the last ten years and had an average of 6.4 years experience of TC practice. Certain people who were older, female

and those with chronic illness were more likely to hold a low internal HLC whilst high internal HLC scores were associated with increased levels of TTC practice. The combination of quantitative and qualitative data revealed there were a number of determinants that influenced the participants in their initiation, adoption, patterns of use and maintenance of TTC as a form of exercise. These included the desire to improve health and well-being, personal expectations and beliefs regarding health control and the efficacy of TTC, and environmental factors. However, motivations varied with exercise stage and socio-demographic variables, such as health status, which played an important role in TTC initiation and adherence. Most people reported multidimensional expectations related to undertaking TTC and perceived a wide range of benefits, including improvements in physical and mental health, relaxation, enjoyment, self-esteem, skill attainment and social connectedness. These positive perceptions of the effects of TTC on their physical and psychological health and well-being and social life had considerable impact in the context of their daily lives.

Conclusion: The experiences and perceptions reported by the participants indicated that TTC was more than just an exercise activity and that for many it represented a positive global health behaviour that had broad-reaching effects on physical, psychological, social and spiritual components of their lives.

Key words: Tai Chi, Taoist Tai Chi™ practitioners, health and well-being, chronic illness, patterns of TC, health locus of control, TC beliefs, expectations, perceptions, benefits, motivations and barriers, self-efficacy, and self-esteem.

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CHAPTER 1 INTRODUCTION

1.1 Background

Physical activity plays an essential role in promoting quality of life and maintaining a sense of wellbeing in addition to reducing the risk of chronic diseases. However, physical functioning and skills decline with ageing and demand more effort and perseverance when performing the activities of daily living, especially for those aged 65 and over (Li, Harmer, McAuley, Duncan, et al., 2001). This is of particular relevance as ageing is one of the biggest problems facing industrialized countries such as Australia, where the number of people over 65 years old in 2006 numbered 2.7 million, comprising 13% of the total population (Australian Institute of Health and Welfare [AIHW], 2008a). Ageing significantly influences health-related quality of life (HRQL) and has become the main cause of morbidity and disabling conditions (AIHW, 2008a). For instance, one in five Australians live with some degree of disability and 60% of the elderly who live with physical restrictions state their health status as being fair or poor (AIHW, 2008a). Physical limitations not only affect individuals by reducing HRQL and increasing the level of suffering, but also pose an emotional and financial burden for both their family and society. In 2005-06, the total expenditure for health in Australia accounted for 9% of national gross domestic product (GDP) and this financial burden has grown due to increasing requirements for health and community support services required by the elderly over recent years (AIHW, 2008a).

As a result, there is pressure for governments to find cost-effective methods of reducing the health budget whilst maximising benefits with limited investment.

Meanwhile, the motivation to achieve better HRQL, to maintain independence and to prevent disease and disability, also drives individuals to find their own personal solutions. Therefore, this has resulted in an increasing emphasis on maintaining optimal health from both health professionals and the popular media, prompting many people to seek out health pursuits to achieve health self-management goals. Health promotion, a process "aimed at arranging the social and structural determinants of health in a way that facilitates health" (McMurray & Clendon, 2011, p. 39), enables people to enhance their ability and capacity to have control over and improve their health. This process has led to increasing numbers of community health promotion programs becoming available, ranging from physical approaches, such as aerobic exercise and weight loss training at one end of the spectrum, to psychological approaches, such as meditation, support groups and psychotherapy, at the other. These forms of programs aim to create a supportive environment for individuals to develop personal skills in order to better manage their health. There are a number of health programs that combine both physical and psychological components of health, rather than considering them to be independent of one another, in what is termed the "mind-body" approach. This approach uses the mind to focus on the body and breathing in combination with body movement. Examples of these approaches, or programs, include various types of yoga, Qigong and Tai Chi (TC) (Larkey, Jahnke, Etnier, & Gonzalez, 2009).

1.1.1 The need for mind-body approaches to health

The "mind-body" approach to health is gaining popularity within modern society and the associated fitness industry with the need to address not only the increase

in physical diseases but also the increasing incidence of mental health problems in the community. In the 2007–08 National Health Survey (NHS) conducted by the Australian Bureau of Statistics (ABS), it was estimated that about one in ten Australians had a long-term mental or behavioural problem, and the proportion of people with mental health problems had nearly doubled from 5.9% in 1995 to 11.0% in 2007–08 (Australian Bureau of Statistics, 2009). The high incidence of mental health disorders adds to the increasingly significant and substantial financial burden being experienced by the community due to an ageing population. In Australia, mental health disorders were placed third (13%) in terms of frequency of occurrence on the burden of disease ranking for broad disease groups in 2003 (Begg et al., 2007). Using depression as an example of one mental health disorder, its associated treatment costs the Australian community over $600 million each year (Australian Government Department of Health and Ageing, n.d.). Consequently, addressing concerns regarding both the mental and physical aspects of health are of equal and parallel importance.

The concept that health not only refers to physical but also to mental well-being has long existed. In 1948 the World Health Organization defined health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (World Health Organization [WHO], 2003). The influence of mental health on physical diseases and function has been investigated and discussed widely in the literature (Eysenck, 1995; Lenze et al., 2001; Brannon & Feist, 2009). According to the Global Burden of Disease study, depression is the leading worldwide cause of disability in both males and females (Mathers, Fat, & Boerma, 2008). Consequently, searching for an effective exercise to meet both physical and psychological needs

simultaneously has become a focus for people who are looking for ways to improve their health and well-being. In this context, TC, as an ancient mind-body approach to promote health, has gained increasing popularity, particularly amongst the elderly, due to its gentle nature and potential benefits in addressing multiple health needs (Wolf, Kutner, Green, & McNeely, 1993; Yan & Downing, 1998; Yeh et al., 2005; Adler & Roberts, 2006; Fetherston & Wei, 2011).

1.1.2 A brief history of Tai Chi

Tai Chi, also known as Tai Chi chuan, Tai ji or Taijiquan, has its roots in the ancient Chinese martial arts. It is also called "moving meditation" (Fasko & Grueninger, 2001) as, in addition to body movement, TC also focuses on mindfulness and relaxation for physical, mental and spiritual cultivation. The philosophy on which TC is based is originally derived from Lao Tzu philosophy, which dates back to 575BC. Lao Tzu, who is also referred to as "Old Sage" or "Li Erh", was an ancient Chinese philosopher and founder of Taoism. The central doctrine of this theory advocates a simple, honest life without desire or selfish intentions and promotes "inner stillness" to achieve longevity (Wong, 1991, p. 1). Tai Chi exemplifies the principles of Taoism, known as wu-wei, which may be explained literally as doing without force, or doing without doing, but in alignment with nature (Huang, 1973).

Although the philosophical origin of TC lies with Taoism, the art of TC unites three Chinese philosophical traditions: Confucianism, Taoism, and Buddhism, and reflects ethics and aesthetics as well as Chinese traditional medicine and cultural history (Alperson, 2008). Tai Chi first appeared in China during the 11th and 12th centuries but

its origin is still an often debated academic issue. The most commonly held position is that TC originated from the Wu-Tang Mountain where a Shaolin monk, called Zhang San-Feng, left his Buddhist monastery to learn from Taoist hermits. This resulted in the development of the Wudonshan sect of Taoism and the emergence of the martial art form of TC that "used softness and internal power to overcome brute force" (Kurland, 1998, p.106). During the subsequent period, teaching TC was exclusively the domain of either Buddhist or Taoist monks until the 17th and 18th centuries when China was conquered by the invading Manchu (Wong, 1991). At this time laws preventing the ownership of weapons were passed by the reigning Manchu. This prompted the dissemination of TC from the monasteries to the people, and the use of TC as of a modified form of self-defence based on the strengthening of whole body systems.

The 108 movements of TC were designed to represent the 36 Celestial Deities of the yang elements of the body and the 72 Terrestrial Deities that refer to the yin elements of our bodies. Therefore the full 108 movements in TC symbolize the harmonious balance between yin and yang thus leading the practitioner to optimal health. Following this, various styles of TC emerged during the late 18th century, including the Chen, Yang, Sun and two forms of Wu styles (Wong, 1991). Each style has its own characteristics, differing in postures, forms, pace and the level of difficulty of performance. However, all styles emphasize movement coordination, relaxation and mindfulness and have been given a classification of low-to-moderate intensity exercise due to a metabolic equivalent of 1.5 to 4.0 and its less than 55% demand for maximal oxygen intake (Yeh, Wang, Wayne, & Phillips, 2009). At present, there are many newer forms, some of which are considerably shorter than the 108 movements. These forms

have been developed for either competition (Tang & Gu, 1963) or to meet the needs of people with a specific health condition, such as diabetes and arthritis (Lam, 1997, 2000; Liu, Miller, Burton, & Brown, 2009).

In China, TC is practiced widely and plays a significant role in public health. The popularity of TC in China is illustrated by the event of the first "National Fitness Day" celebrated in Beijing on 8th August 2009, in which three million TC practitioners practiced TC together (Chang, 2009). Today, all styles of TC, with their differing forms, are being practised in contemporary China. For instance, the Cheng Style of TC is still the preferred form in the place where TC originated (Yang, 2004). However, the simplified 24 Form Tai Chi Chuan, modified from the 108 Yang style, is promoted by the government as a public health promotion strategy and is well-accepted, mostly by older and elderly adults in China (Li, Shen, Ruan, & zhuang, 2003; Li et al., 2003). It is common for Chinese TC practitioners to practise TC about five times a week or more in public areas, such as streets, parks, squares or riversides in small, self-organized groups (Li, Shen, et al., 2003; Li, Xu, et al., 2003; Yang, 2004). In addition, other forms of TC, such as TC sword and TC fan, are also being practised.

Tai Chi, although once considered a suitable and effective exercise to promote health in the elderly due to its slow, non-stressful, non-competitive and cost-effective nature (Yan & Downing, 1998), has now become popular with all age groups in China. Schools and universities in China now teach the simplified 24 Form TC, which was introduced by the Chinese National Sports Commission in 1956 (Tang & Gu, 1963), as a form of physical education. The teaching of TC in the education system is considered to play a positive role not only in developing balanced physical and mental health but

also in cultivating virtue (Wei, 2009). Additionally, TC is considered a way for other countries to understand Chinese culture and is regarded as a bridge of friendship between China and other societies. This is exemplified by the 11th Asian Games of 1990, where more than 1,400 Chinese and Japanese performed TC together at the opening ceremony ("Beijing 1990 Asian Games Opening Ceremony," 2008)

The popularity of TC, as is experienced in China, has now begun to be disseminated to other countries due to its health-related benefits (Yan & Downing, 1998; Klein & Adams, 2004). In the United States, over twenty States have officially proclaimed World Tai Chi & Qigong Day (WTCQD) ("Officially Recognized World TC & Qigong Day's Health Education Efforts," n.d.) and it was estimated that approximately 2.5 million Americans practise TC (Birdee, Wayne, Davis, Phillips, & Yeh, 2009). Alongside the rapid growth of countries and individuals adopting TC as a means of promoting health and well-being, there has been an increasing amount of academic interest in the potential health benefits of this practice. The popularity of TC and the associated increasing need for clinical validation of its benefits were foreseen in the 1970s (Klein & Adams, 2004). Since then, studies on TC have shown a significant increase in the number of published clinical trials and scientific reports. The WHO and Western countries, such as the United States, Canada and Australia, have recognized the contribution of TC to health and advocated it as an alternative health promotion strategy ("Officially Recognized World TC & Qigong Day's Health Education Efforts," n.d.). For example, TC is now recommended as a complementary therapeutic option for arthritis supported by the Arthritis Foundation in Australia and the USA (Lee, Pittler & Ernst, 2007a), whilst in Canada, there is a Health Recovery Program using intensive TC

training to improve health and HRQL for people who are suffering from chronic illnesses or those recovering from injuries (Giblett, 2008a).

1.1.3 The International Taoist Tai Chi™ Society

One of the most widely practised forms of TC in Western countries is Taoist Tai Chi™ (TTC), which is taught by the International Taoist Tai Chi™ Society (TTCS) in approximately 500 branches throughout 25 countries (Giblett, 2008b). The Society has its roots in Canada where its founder, Mr Moy Lin-shin (1931-1998), first incorporated the Toronto TC Association in 1973 (Wong, 1991). This was later to become the TTCS of Canada and then the International TTCS. Mr Moy was a Taoist monk and TC master who, after commencing temple training in the HuaShan School of Taoism, moved to Hong Kong where he studied under Masters who were highly respected instructors in Lok Hup Ba Fa (Lok Hup), TC and other arts, such as the Eagle Claw style of Kung Fu, Hsing-I, push hands and Ch'i Kung. Although considered a Master of the Taoist arts, he preferred to be known as Mr Moy as he considered equality among people to be an important component of his beliefs (C. Fetherston, personal communication, July 19, 2010; Giblett, 2008a). In his early years, Mr. Moy experienced considerable ill-health which continued into adulthood. As he devoted his life to studying these arts, his health slowly improved and he vowed to devote his life to helping others to improve their health through TC. Based on his knowledge, achieved through studying the healing principles of the Taoist and martial arts, Mr Moy developed a system for health that is now known as the TTC Arts of Health. This form of TTC is influenced strongly by the Taoist tradition and was synthesized from knowledge of the arts of ch'i kung, Lok Hup

and Taoist internal alchemy (Wong, 1991). Ch'i kung (also known as Qigong) involves meditation, breathing and physical exercise and is characterised by various Chinese systems of training that reflect the Taoist beliefs and traditions that lead to health and longevity, whereas Lok Hup is an even older internal art designed to stimulate and massage the internal organs and exercise the spine (Wong, 1991).

The aims of the TTCS are to make TC available to all, to promote the health-improving qualities of the TTC internal arts, to promote cultural exchange, and to help others. These aims are achieved through the Taoist values of selflessness and service to others. Therefore, all trained instructors are volunteers and all the branches of the Society operate on a not-for-profit basis. Teaching TC and serving others are considered a privilege that enables instructors to grow in the Taoist philosophy. Members of the Society consider this privilege to be a gift.

In keeping with Taoist tradition, TTC is communicated by passing knowledge of the form from teacher to student by means of demonstration and oral communication, rather than from a book, DVD or video, although these forms may be used as an adjunct to learning. In addition to TC, the Society also offers TC sword, TC sabre, Lok Hup and meditation for those students who wish to extend their experience of the Taoist arts. The focus of the TTCS, on achieving optimal health, also led to the development of a Health Recovery Program, under the guidance of Mr. Moy, which is now taught in many TTCS branches throughout the world. This resulted in the opening of the Health Recovery Centre at Orangeville in Canada, which assists people with severe physical health problems to improve their mobility, confidence and self-efficacy (Giblett, 2008a).

Taoist Tai Chi™ was introduced into Australia by Heath Greville in 1980 after she studied in Toronto with Mr. Moy. The Fremantle Taoist Tai Chi Association was first incorporated in Fremantle in Western Australia (WA) in 1984. The Association grew from there to spread throughout Australia in the 1990s and the TTCS of Australia was legally incorporated in 1993. Today Western Australia makes up the Western Region of the TTCS and has approximately 22 branches in 2013.

However, despite the rapid growth in TTC practitioners in Australia, many questions regarding its patterns of use, that is, the "who, what, why, where, when and how?" associated with practising TC still remain unknown. In order to assist both individuals and health professionals with making informed decisions related to the health promotion of TC, it is necessary to explore these foundational questions and a good place to begin is to understand TTC practitioners' perceptions of the effects of TC on their health and well-being. Currently, one of the major challenges confronting community health promotion is finding realistic approaches that best suit actual and regional situations rather than applying global models which may not be appropriate to the local conditions (McMurray, 2003). Therefore, it is important to ascertain information on patterns of TC use and its perceived effects on health and well-being in the local context.

1.2 Rationale and Significance

This study is significant in three ways. Firstly, it contributes new knowledge regarding the characteristics of people who choose to practise TC in Australia and their patterns of use most commonly undertaken. Although there exists two previous studies

conducted in the United States and China, which investigated patterns of use of TC, their findings were based on retrospective data from the 2002 National Health Interview Survey (NHIS) (Birdee et al., 2009) and the Shanghai Women's Health study (SWHS) and Shanghai Men's Health study (SMHS) in China (Birdee et al., 2013). This current study provides information from a cross sectional questionnaire specifically designed to gather data relevant to TC as practised in an Australian setting that is also nested within a broader international society, and will thus provide valuable information to both domestic and international researchers in the area of TC study. Furthermore, knowledge in this area will assist health care professionals and health promotion planners to understand the contexts in which people choose TC as a method of improving and maintaining health and the difficulties and motivating factors they encounter, in addition to its perceived effects on their health and well-being.

As mind-body practices, such as TC, grow in popularity in Australia, it is essential that health professionals are conversant with these practices and how people with health conditions undertake these strategies in an attempt to improve their health. In regard to this, it is anticipated the findings from this study will assist in informing health care professionals, such as doctors, nurses, chiropractors, naturopaths and physiotherapists, when discussing potential exercise treatments based on the individual patient's needs.

Secondly, knowledge regarding patterns of TC practice in the community will assist policy-makers and health experts to target health promotion approaches appropriately. This study provides valuable information in the local context regarding who does TC, why they choose TC, what the factors are influencing their TC initiation,

adoption, practice and adherence, and what patterns of practice are most commonly used. This knowledge, combined with people's perceptions of the barriers and motivations associated with practising TC, are all essential for determining the most relevant approaches in TC promotion and establishing successful health promotion strategies involving TC. Furthermore, TC associations can also benefit greatly from the information provided by this study, which it is anticipated will assist TC associations to tailor the design and delivery of TC classes and develop appropriate teaching methods in accordance with the individual's need.

Thirdly, this study aims to provide information for community members who may have a potential need to investigate TC as a self-management strategy to maintain or improve health status and well-being, particularly amongst the elderly and individuals with a variety of medical conditions, including chronic disease. As existing research has reported a wide range of benefits of TC for a variety of different populations, the number of people who choose TC as a health self-management strategy to either improve or maintain their health and well-being appears to be increasing. Furthermore, for the elderly and those who are reluctant or unable to do conventional or rigorous exercise, TC may provide them with an alternative option due to its gentle, smooth and slow movements. It is hoped the data provided by this study will assist those people who may wish to undertake TC as a strategy in assisting with self-management of their health problems to understand the reasons why other people have chosen TC, the benefits they have gained and problems they encountered. This will, in turn, enable them to make an informed decision when considering TC as an individual form of health management. Providing such information may also encourage

people to take responsibility for their own health self-management based on well-informed decision-making.

1.3 Aims of the Study

The purpose of this study is to better understand the phenomenon of TC as a form of exercise within the Australian context of the TTCS. To achieve this, this study aims to:

- describe the characteristics of TTC practitioners in WA and the patterns of practice most commonly undertaken;
- investigate the main motivations and barriers in TC initiation, adoption, practice and adherence;
- examine participants' beliefs regarding their health control and the efficacy of TC and the impact these beliefs have on TC associated behaviours;
- investigate the impact of exercise environment and individual expectations on TC behaviours; and
- explore TTC practitioners' perceptions of the effect of TC on their health and well-being.

1.4 Research Questions

This study aims to answer the following research questions:

- What are the characteristics of people who choose to practice TTC in WA?
- What are the patterns of use for people practising TTC in WA?
- What are the factors perceived by practitioners that either prevent or motivate them to undertake and continue to practise TTC?

- How do practitioners of TTC perceive its effects on their health and well-being?

In summary, a brief history of the development of TC and the TTCS has been described along with the role TC plays as a form of mind-body exercise for both physical and psychological health and well-being. This has led to an outline of the significance, aims and research questions of this study where the patterns of use of TC practice in WA and practitioners' perceptions of the effects of TC on their health and well-being will be investigated.

1.5 Structure of the Thesis

This first chapter has introduced the background, significance and purpose of this study and illustrates the study focus and research questions. Chapter two explores existing research and literature related to TC and its role in health care and health promotion, including its effectiveness on psychological and physical health and well-being, while the theoretical framework used to guide the study is described in Chapter Three. Chapter Four outlines the methodology utilised, including design, data collection and data analysis procedures. Ethical considerations in the conduct of the study are also included in this chapter. Then, the analysis of the quantitative data and the researcher's interpretation of the qualitative data gathered from open-ended questions, with its subsequent findings, are presented respectively in Chapters Five and Six. Chapter Seven explains the TC Heath Behaviour Model developed from the findings of this study, depicting how TC practitioners change their behaviour through TC practice in order to achieve a holistic health status. The final chapter, Chapter Eight,

discusses the significance of the research findings in the context of existing literature, whilst outlining the study's limitations and considerations of the study's implications for TC health promotion, practice and future research.

1.6 Glossary

The common terminology, abbreviations and acronyms used in this study are listed in an alphabetical order below:

Acronym	Term
ABS	Australian Bureau of Statistics
AIHW	Australian Institute of Health and Welfare
BMI	Body Mass Index
BP	Blood pressure
CAM	Complementary and alternative medicine
CFA	Confirmatory factor analysis
CHF	Chronic heart failure
CHLC	Chance Health Locus of Control
CVDs	Cardiovascular diseases
CVDRFs	Cardiovascular disease risk factors
DBP	Diastolic blood pressure
EFA	Exploratory factor analysis
FA	Factor analysis
FBG	Fasting blood glucose
HLC	Health locus of control
HRQL	Health-related quality of life
IHLC	Internality Health Locus of Control
MHLC scales	The Multidimensional Health Locus of Control scales
MSDs	Musculoskeletal disorders
OA	Osteoarthritis
PHLC	Powerful Others Health Locus of Control
RA	Rheumatoid arthritis
RCTs	Randomized controlled trials
SBP	Systolic blood pressure
SLT	Social learning theory
TC	Tai Chi
TTC	Taoist Tai Chi™
TTCS	The International Taoist Tai Chi™ Society
VO_2 Max	Maximal oxygen uptake
WHO	World Health Organization

CHAPTER 2 LITERATURE REVIEW

2.1 Introduction

This chapter reviews the existing literature related to the health effects of Tai Chi (TC) from preventative, rehabilitative and societal perspectives. This literature review is directed from two main viewpoints relating to health and well-being, which are health care and health promotion. In the health care section, the existing evidence on health benefits of TC amongst people with a variety of medical conditions, including cardiovascular diseases (CVDs), diabetes, musculoskeletal diseases (MSDs), cancer and mental health problems is examined. The section on health promotion discusses the effects of TC on aerobic capacity, falls reduction and falls prevention in older people, health-related quality of life (HRQL) and self-efficacy. Finally, a brief discussion about the role of TC in promoting community health from a social perspective is given.

2.2 Literature Search Methods

A broad computerized systematic literature search was conducted initially at the study's inception, during June to December 2010, with more focused searches conducted as relevant at varied intervals during the study and finally during the completion process. The following electronic medical, nursing and education databases were used: CINAHL with full text, Wiley Interscience, MEDLINE, Nursing Resource Center, Proquest, PubMed, SCOPUS (Elsevier), Academic OneFile, Health Collection, Murdoch University Library, SpringerLink, EBSCOhost, PsycNET and Chinese databases (China National Knowledge Infrastructure). The search items used were

limited by key words: Tai Chi, T'ai Chi, tai chi chuan, Taiji or Taijiquan and related topic words, such as, for example, hypertension, diabetes, stress and anxiety. There was no restriction on population characteristics, but for feasibility reasons, the publication chosen had to be written in English or Chinese. Tai Chi associations and experts were also contacted and asked to contribute unpublished materials and further information.

Additionally, the BONUS program and Document Delivery Service from the Murdoch University Library were required for the texts not available and the Web search engines, "Google", "Google Scholar" and "Baidu", were accessed to also search for information and databases on the World Wide Web. Dissertations and abstracts were included.

2.3 The Role of Tai Chi in Health Care

In Western health care, TC is often considered as a complementary and alternative medicine (CAM) (Kannan, Gaydos, Atherly, & Druss, 2010) or Mind-Body therapy (MBT) (Nerurkar, Yeh, Davis, Birdee, & Phillips, 2011), which may be used as an adjunct to conventional medical care. In line with this, there has been a steadily increasing body of research investigating the effects of TC on disease prevention and rehabilitation in recent decades. A number of systematic reviews have shown that TC can be beneficial to individuals with a variety of medical conditions in varying populations and plays an essential role in chronic illness self-management. Its benefits include enhancing cardio-respiratory fitness, reducing blood pressure (BP), improving glucose control in diabetic patients, increasing immune response, alleviating pain and assisting in the rehabilitation of people experiencing chronic health conditions, in

addition to promoting psychological well-being (Lee, Pittler, Taylor-Piliae, & Ernst, 2007; Lee, Pittler, & Ernst, 2007a; Yeh, Wang, Wayne, & Phillips, 2009; Fasko & Grueninger, 2001; Verhagen, Immink, Van Der Meulen, & Bierma-Zeinstra, 2004; Wang, Collet, & Lau, 2004; Wolf, et al., 1996; Wu, 2002; Yeh, Chuang, Lin, Hsiao, & Eng, 2006; Wang et al., 2009). A detailed review of the evidence of these benefits is now discussed below.

2.3.1 Cardiovascular disease and hypertension

There are a plethora of studies and reviews that have been conducted in the area of cardiovascular conditions and TC, including three recent systematic reviews (Lee et al., 2007; Yeh, Wang, Wayne, & Phillips, 2008; Yeh et al., 2009). The most recent (Yeh et al., 2009) reviewed the cardiovascular effects of TC as an intervention of physical exercise for patients with CVDs or with CVD risk factors (CVDRFs), whilst the 2008 review focused on nine randomized controlled trials (RCTs) that examined the effects of TC on BP amongst patients with and without cardiovascular conditions. These reviews concluded there were positive effects associated with TC in relation to reductions in BP and risk factors for heart disease.

Blood pressure has been reported to be significantly reduced in clinical trials involving patients with CVDs and CVDRFs after participating in TC (Wolf et al., 1996; Wolf et al., 2006; Lan, Chen, Lai, & Wong, 1999; Young, Appel, Jee, & Miller, 1999; Tsai et al., 2003). In an early study (Channer, Barrow, Barrow, Osborne, & Ives, 1996), 126 patients recovering from acute myocardial infarction were randomized into three groups, which included a non-exercise support group (n = 47), an aerobic exercise

group (n = 41) and a TC group (n = 38). Heart rate and blood pressure were recorded before and after each session. After eight weeks, they found that there were significant reductions in systolic blood pressure (SBP) in both exercise groups ($p < .05$). However, a significant reduction in diastolic blood pressure (DBP) ($p < .01$) only occurred in the TC group. However, TC participants had a higher compliance rate than did the control group. Reductions in both SBP and DBP after TC have also been reported in more recent studies (Taylor-Piliae, Haskell & Froelicher, 2006a; Liu & Li, 2004; Tsai et al., 2003), although findings have not always shown TC to have benefits over other forms of exercise. This is evidenced by a RCT to compare the difference between moderate-intensity aerobic exercise and TC (Young et al., 1999). In this study sedentary older adults with hypertension (n = 62) were divided into two groups, a walking and aerobic dance group and a low-intensity TC group. Although reductions in blood pressure were observed in both groups, no significant differences between groups were observed.

A series of studies on the effects of TC on a wide range of health problems have been conducted since 2004 by a research group led by Dr. Gloria Yeh from the Harvard Medical School, and have included seven studies related to CVD (Yeh et al., 2004, 2005; Yeh, Davis, & Phillips, 2006; Yeh, Wang, et al., 2008, 2009; Yeh, Mietus, et al., 2008; Yeh et al., 2011). One of these studies (Yeh et al. 2004) investigated 30 patients with chronic heart failure (CHF) who were randomized into two groups: a TC intervention group for one hour twice weekly, or a control group receiving usual care only. Usual care consisted of pharmacologic therapy and dietary and exercise counselling. After 12 weeks, patients with TC showed significant improvements in

disease-specific quality of life (p = .001) and 6-minute walk distance (p = .001), and a significant decrease in serum B-type natriuretic peptide levels (BNP) (p = .03) compared with the control group. The decreased levels of BNP are of interest as this may indicate a lowering of CVD risk in the intervention group. In Yeh's latest study (Yeh et al., 2011), the improvements in exercise capacity, mood and quality of life have also been found in patients with heart failure as a result of TC intervention. In addition, Yeh et al. (2008) also reported a significant improvement in sleep stability. Reductions in disease-related symptoms and depression (Barrow, Bedford, Ives, O'Toole, & Channer, 2007), combined with improved sleep stability, may contribute to a better quality of life. However, a lack of blinding and confounding factors related to the extra contacts, which occurred both with social and clinical staff by study participants, may limit the interpretation, as this extra interaction may have benefited the patients and influenced the interpretation of the results.

In addition to a significant reduction in blood pressure, improvement in lipid metabolism in order to reduce the risk factors for heart disease has also been observed in people with CVDRFs (Tsai et al. 2003; Zhou, 2007; Liu & Li, 2004). One such RCT conducted by Tsai et al. (2003) demonstrated a significant decrease in serum total cholesterol, mean triglycerides (TG), and low-density lipoprotein cholesterol (LDL) and an increase in high-density lipoprotein cholesterol (HDL) after 12 weeks of TC exercise in patients with hypertension. These findings supported Chang's study (2007) where a significantly decreased total cholesterol and LDL-cholesterol between zero and three, and zero and six months in a TC group, compared with a control group undertaking normal daily physical activity. Similar improvements in lipid profile have also been

reported in other clinical studies (Liu & Li, 2004; Zhou, 2007; Song, Ahn, So, et al., 2009).

As illustrated there have been numerous studies investigating the benefits of TC in people with CVD and CVDRFs, which have found improvements in blood pressure control, sleep quality and lipid metabolism. Due to TC's additional effects on lowering DBP, a higher exercise compliance rate, along with a reduced lipid profile and a stable sleep pattern, some scholars suggested that TC should be considered as a safe alternative form of exercise in cardiovascular risk management and an effective adjunct therapy for patients with heart conditions (Channer et al., 1996; Yeh et al., 2009; Park et al., 2010).

2.3.2 Tai Chi and management of diabetes mellitus

As it is estimated that the world-wide prevalence of diabetes will exceed 300 million by 2025 (Bjork, 2001), effective diabetes management and prevention have become major concerns for health authorities internationally. One strategy recommended by the American Diabetes Association (ADA) is to undertake moderate-intensity exercise for at least 150 minutes weekly in order to address both preventative and rehabilitative issues associated with diabetes (American Diabetes Association, 2008). Current research shows that TC, as a low-to-moderate intensity exercise is more likely to provide benefits for people with Type 2 diabetes in a variety of complex physiological areas. These benefits range from improvements in blood glucose control, insulin resistance and immune function to positive changes in mood and quality of life (Tsang, Orr, Lam, Comino, & Singh, 2007; Song, Ahn, Roberts, Lee,

& Ahn, 2009). In addition, specifically tailored TC programs have been innovated and are now being promoted by Diabetes Australia for treating and preventing diabetes (Lam, 1997, 2000; Liu, Miller, Burton, & Brown, 2009). Although statements supporting the efficacy of TC in the management of diabetes have been made in a systematic review of the literature up to 2007 (Lee, Pittler, Kim, & Ernst, 2008), evidence included in this review was limited. Further studies have now been conducted which report significant improvements in glucose metabolism, insulin resistance, immune function and HRQL. These are now outlined in more detail in addition to the findings from the systematic review.

The effects of TC on glucose control, diabetic self-care activities, and quality of life were examined in a quasi-experimental study of 99 people diagnosed with type 2 diabetes and a glycosylated haemoglobin (HbA1c) of 6.0 or higher (Song, Ahn, Roberts, et al., 2009). This study used a modified form of 19 movements from the Yang and Sun styles where TC was undertaken twice weekly for 6 months. Participants were divided into two groups, an "adherent group" defined as 80% exercise attendance and a "non-adherent group" defined as less than 80% attendance. Pre-test and post-test measures at 3 and 6 months were completed. The adherent group showed a significant reduction ($p < .05$) in fasting blood glucose (FBG) and HbA1c ($p < .05$) compared to the non-adherent group. In addition to this, TC participants demonstrated a significantly higher ($p < .05$) quality of life measured by 36-Item Short Form Health Survey version 2 (SF-36v2) and performed more diabetes-related self-care activities, such as compliance with diabetic diet, medication, glucose management, exercise and hospital visits. In addition to decline in FBG, increased nerve conduction velocities ($p = .046$)

and improved insulin resistance index (p = .079) have been observed in TC participants in a Taiwan study (Hung et al., 2009). These findings are also supported by studies undertaken by Jiang (2007) and Zhang and Fu (2008), where type 2 diabetes participants were undertaking a 14-week and a 20-week TC program respectively. The TC groups experienced similarly lower FBG, TG, and glycated serum proteins (GSP) along with higher fasting plasma insulin (FPI) levels compared with the control group. Jiang (2007) indicated that TC may contribute to enhance insulin sensitivity by improving insulin receptor and cell adhesion due to an increasing maximum oxygen consumption and glucose uptake in skeletal muscle in patients with diabetes.

In addition to studies investigating FBG, lipid profiles and insulin, S. Yeh and his research team conducted a series of studies on the effects of TC on the immune system of people with diabetes (Yeh et al., 2006; Yeh et al., 2007; Yeh et al., 2008). Significantly increased CD4 CD25 regulatory T-lymphocytes and transforming growth factor β (TGF-β) and interleukin 10 (IL10) were reported in TC participants after 12 weeks of practice (Yeh et al., 2006), although there was no change in blood cell count including white blood cells, erythrocytes, and platelets (Yeh et al., 2007). The $CD4^+$ $CD25^+$ regulatory T cells are a component of T regulatory cells that play a crucial role in inhibiting excessive actions of auto-reactive T cells in the pancreas, thereby preventing diabetes progression, whilst TGF-β inhibits autoimmune diseases via the regulation of the size of the $CD4^+CD25^+$ regulatory T cell pool in vivo (Peng, Laouar, Li, Green, & Flavell, 2004). Continuing work from their previous study, Yeh et al. (2008) further confirmed the effect of regular TC exercise on the immune system by finding a significant decrease in HbA1C and an increase in T cell transcription factor

(T-bet) expression along with an increase in Interleukin (IL) 12 and a decrease in IL 4 concentration in patients with Type 2 diabetes after following a 12-week TC intervention. Further to this, an increased complement Factor H acting to protect against microangiopathy and macular degeneration (Yang et al., 2010) may be another significant finding in the positive effects of TC on the immune system.

However, positive findings are not consistent. Other studies, which varied greatly in the intensity, duration and frequency of TC undertaken, failed to show significant results (Orr, Tsang, Lam, Comino, & Singh, 2006; Tsang, Orr, Lam, Comino & Singh, 2008; Shen et al., 2007). For example, in a double-blind RCT (n = 38) using a low intensity modified TC of 12 movements twice weekly for 16 weeks, Tsang et al. (2008) found no significant improvement in HbA1c and insulin sensitivity measured 72 hours after exercise in the TC group, despite a high level of compliance.

Mobility impairment is one of the major concerns amongst people with diabetes due to diabetes complications and low muscle power (Orr et al., 2006; Bruce, Davis, & Davis, 2005). Research shows older adults with diabetes have a two- to three-fold risk of injurious falls and physical disability (Park et al., 2006), which considerately impact their quality of life. Tai Chi has also been shown to have positive effects on the muscular skeletal and nervous systems, thereby improving functional ability in the elderly. This is evidenced in studies showing: improved balance and flexibility; increased respiratory function and muscle strength related to knee extension and flexion in the elderly; and improvements in peripheral nerve modulation and somatosensation in the lower extremities, particularly bilateral median and tibial nerves, and distal sensory latencies of bilateral ulnar nerves (Lan, Lai, Chen, & Wong, 1998; Hung et al., 2009;

Cavegn, 2011). One recent study (Ahn & Song, 2012) using a 12-week TC intervention of one hour session twice weekly in people with Type 2 diabetes and neuropathy demonstrated significant improvements in neuropathic symptoms, glucose control, balance, and quality of life. In addition, improvements in ankle proprioception and decreased plantar pressure in the forefoot in patients with Type 2 diabetes indicate that TC has the potential to reduce the fall risk in the diabetic by improving general fitness and ankle proprioception (Cavegn, 2011). As a result, there are now special TC programs, which have been designed to address health problems experienced by people with diabetes, one of which is called "Tai Chi for Diabetes", which contains 11 basic movements and eight advanced movements, warm-up, wind-down, and qigong breathing exercises based on the Sun and Yang styles of TC (Lam, 2000). This specially designed TC program was used in clinical trials conducted in Australia which examined the effects of TC on mobility and metabolic control (Orr et al. 2006; Tsang et al., 2007, 2008). These researchers found a significant improvement in the intervention group, who were using TC twice a week for 16 weeks. Balance index measured by six tests of static balance and postural control was improved (p = .03), as was maximal gait speed (p = .005) and performance in the 6-min walk test (p = .06) over time. There was also a forward trend towards improved habitual gait speed (p = .053).

Improvements in long-term complications are highly correlated to HRQL (Australian Institute of Health and Welfare [AIHW], 2008b). However, evidence associated with the beneficial effects of TC in HRQL in people with diabetes is limited (Lam, Dennis, & Diamond, 2008; Song, Ahn, Robert, et al., 2009; Shen et al., 2007). One of these studies, a 53-participant RCT (Lam et al., 2008), reported increased social

and physical role functioning (p = .024, p = .04, respectively), and general health perceptions (p = .044) after a six-month specifically designed TC program for diabetes. These results are supported by other studies (Song, Ahn, Robert, et al., 2009; Wang & Cao, 2003), wherein improvement in physical function (p < .01), mental health (p < .05) and better social functioning all contributed to a better quality of life in people with diabetes in a community setting.

Overall, scholarly articles have indicated that TC is likely to have beneficial effects for people with Type 2 diabetes in a variety of complex physiological areas from improvements in FBG, insulin resistance, increased immune system and peripheral sensation in the lower extremities to balance and social life, with a positive correlation between improvement and compliance being evidenced (Tsang et al. 2007). However, physical response is likely to be influenced greatly by the frequency, duration and intensity of exercise. For instance, the effect of exercise on insulin sensitivity was only maintained for two or three days and then disappeared within three to five days (Sato, Nagasaki, Nakai, & Fushimi, 2003; Deen, 2004). Therefore, long breaks without TC practice and short-term TC programs may not have the desired effects on glucose and lipid metabolism and physical function. Further research is required to determine the effective dose of TC required to achieve a satisfactory therapeutic response in Type 2 diabetes patients.

2.3.3 Tai Chi and pain management

Musculoskeletal conditions were the second most commonly managed problem by Australian General Practitioners (GPs) during 2005–06 with more than 6 million

Australians (31% of the population) affected by arthritis and other musculoskeletal problems (Australian Institute of Health and Welfare [AIHW], 2008a). Pharmacological and non-pharmacological treatments are normally involved in the pain management of these conditions. Generally, pharmacological treatments primarily focus on pain relief. However, the cost, side effects and interaction with other medications are considerations of concern. Conversely, multifaceted non-pharmacological treatments provide patients with cost effective opportunities to relieve pain, improve physical function and prevent disability with less short- and long-term side effects. Non-pharmacological treatments consist of health promotion education programs, physical activity, stress management and joint protection measures. Tai Chi is one such intervention and has been officially recommended as a strategy to assist in managing arthritis by the National Arthritis Foundation in the U.S. and Australia (Hall, Maher, Latimer, & Ferreira. 2009; Reid et al., 2008). Specifically, some TC forms, modified to meet the needs of patients, have been developed to assist in improving physical functioning related to arthritis (Lam, 1997, 2000).

The effectiveness of TC in assisting with the reduction of pain and disability associated with musculoskeletal conditions, particularly osteoarthritis (OA) and rheumatoid arthritis (RA), has been investigated in a number of reviews (Hall et al., 2009; Han et al., 2004; Lee et al., 2007a, 2008). One of them conducted a meta-analysis to evaluate the effectiveness of TC on decreasing pain and disability and improving HRQL and physical function in people living with chronic musculoskeletal pain (Hall et al., 2009), whereas another two systematic reviews specifically investigated the effects of TC on OA (Lee et al., 2008) and RA (Lee et al., 2007a). In this section, we will

review the effectiveness of TC on three common musculoskeletal conditions: arthritis, headache and back pain.

The effects of TC on arthritis have been investigated in a variety of clinical trials. In one single-blind RCT of 40 patients with symptomatic tibiofemoral OA (Wang, et al., 2009), participants were randomly assigned to a TC group or an attention control group receiving a wellness education and stretching program twice weekly for 12 weeks. A significant reduction in pain ($p < .001$) using the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) was observed in the TC group after the 12-week TC intervention and at the 24 months follow-up ($p = .05$), compared to the control group. Tai Chi participants also demonstrated overall improvements in physical function ($p = .001$), depression ($p = .009$), self-efficacy ($p = .04$) and HRQL ($p = .004$). Notably, significant improvements in self-efficacy and depression observed in the TC group were maintained for as long as 48 weeks ($p = .007$, $p < .001$, respectively). These findings are similar to another recent RCT involving a population of 35 older women with knee OA (Ni, Song, Yu, Huang, & Lin, 2010). After undertaking TC for two to four times per week for 24 weeks, TC participants demonstrated significant improvements in pain ($p = .001$), stiffness ($p = .043$), physical function ($p < .001$), the six-minute walk distance ($p = .003$) and the stair climb time ($p = .001$), compared to an attention control group. In addition, increased knee extensor muscles endurance and bone mineral density also have been found in older women with OA as a result of TC practice (Song, Roberts, Lee, Lam, & Bae, 2010). These improvements can indirectly enhance self-confidence and self-efficacy by providing more independence in activities of daily living and assisting with relaxation. This is evidenced by comments TC

practitioners with RA made during interviews in a quantitative and qualitative study (Uhlig, Fongen, Steen, Christie, & Ødegård, 2010, p. 47), such as:

"Due to increased awareness I can take a deep breath and be more present in a difficult movement, like picking up something from the floor, this makes the movement easier [Female, 45 years]".

"After the tai chi class I was full of energy and ready to face my life [Female, 59 years]".

"I stop in rather stressful situations at the office and do TC which helps me to become more relaxed [Female, 56 years]".

In addition to the clinical trials examining the effects of TC on arthritis, there have also been a small number of studies investigating the effect of TC on reducing headache. One RCT (Abbott, Hui, Hay, Li, & Pan, 2007) investigated the effect of TC on the treatment of tension headaches, wherein the impact of headaches and HRQL were assessed by the headache impact test (HIT-6TM), a six-item short-form survey (Kosinski et al., 2003), and the SF-36v2. After 15 weeks of TC intervention, significant improvements in headache ($p < .05$), energy/fatigue ($p < .05$), social functioning ($p < .05$), emotional well-being ($p < .05$), mental health ($p < .05$) and HIT score ($p < .05$) were observed in the TC group, compared to usual care. The mechanisms involved in the positive effects observed are not completely understood, but it may be related to relieving the potential causes of headaches, such as stress or tension, by slow and mind-focusing movements, deep breathing and relaxation, all of which are involved in TC.

The effect of TC on reducing back pain is another currently emerging field of study. Although TC has been reported as one of the most frequently used complementary and alternative medicines for patients with back pain in the US (Kanodia, Legedza, Davis, Eisenberg, & Phillips, 2010), the first pragmatic RCT related to evaluating the effect of TC on back pain and disability in people with long-term low back pain is currently being undertaken by an Australian research team (Hall, Maher, Latimer, Ferreira, & Lam, 2009; Hall, Maher, Lam, Ferreira, & Latimer, 2011). In this trial, participants (n = 160) were randomly allocated to a 10-week TC intervention group or a wait-list group only receiving usual care. The preliminary results show that the bothersomeness of back symptoms, pain intensity and self-report pain-related disability have improved as a result of TC practice. Although there is little existing data available that explains the underlying mechanisms associated with the reduction of back pain in people undertaking TC, the research team believes that previous research findings in relation to the improved muscle strength, flexibility, physical function, HRQL and reduced pain provide an explanation for the study's findings.

Collectively, evidence-based clinical trials to date show that TC could reduce pain and disability, and improve physical functioning and flexibility for people with musculoskeletal pain, particularly with arthritis. As no equipment is required to undertake TC and it is group-focused, TC may also be a good option as a self-management strategy to reduce pain and improve physical function in community settings (Reid et al., 2008). However, the efficacy of TC on reducing pain and disability reported may be overestimated due to small sample sizes (Schieir, Adeponle, Milette, & Thombs, 2010) and short-term effects. A longitudinal study with a large sample size

would help to confirm the benefits of TC for people who suffer chronic or debilitating musculoskeletal conditions and the potential effects of TC on the psychological impact in pain management should be addressed.

2.3.4 Tai Chi as a supportive therapy for cancer sufferers and survivors

Cancer is a leading cause of global mortality and was responsible for 13% of all deaths in 2008 (World Health Organization [WHO], n.d). As long-term survival rates of cancer patients, achieved by better diagnostic tools, earlier detection and improvements in treatment (AIHW, 2008a), continue to increase, an important goal for cancer patients is to improve their HRQL. There is growing evidence showing that physical activity contributes to the relief of cancer and cancer treatment-related symptoms, such as fatigue, sleep disturbance, vomiting and nausea, as well as the prevention and treatment of mental health problems, such as depression and anxiety, which are common issues in cancer survivors (Courneya, Mackey & McKenzie, 2002; Courneya, 2003; Humpel & Iverson, 2007). Given these considerations, TC has recently received attention from the research community due to its potential to address not only physical well-being but also the psychological needs of cancer sufferers and survivors (Mansky et al., 2006). The effectiveness of TC has been examined in regard to its effects on physical functioning, QOL and other psychological variables in a number of reviews (Mansky et al., 2006; Lee, Pittler, & Ernst, 2007b; Lee, Choi, & Ernst, 2010; Sprod et al., 2012). Most of the clinical trials evaluated in these reviews were related to breast cancer and conducted in the USA. Significant improvements in physical functioning and mental well-being

including, shoulder joint and upper limb function, self-esteem and anxiety, have been reported.

Evidence of improvement in physical functioning has been observed in a RCT of 31 post-treatment breast cancer patients (Mustian, Katula, & Zhao, 2006). Tai Chi participants (n = 11) undertaking TC for three times a week for 12 weeks demonstrated significant improvements in six-minute walking distance ($p < .05$), handgrip strength ($p < .05$), flexibility ($p < .05$) and a slight decrease in percentage of body fat ($p > .05$), compared to the control group (n = 10), which received a 12-week psychosocial support therapy. Conversely, participants in the psychosocial therapy group (n = 10) showed a decline in aerobic capacity ($p > .05$), muscular fitness ($p > .05$), and a slight increase in percent of body fat ($p > .05$). Similar findings were also observed by Eom (2007) in a study involving early mastectomy patients. He found breast cancer patients with mastectomy demonstrated a significantly increased shoulder range of motion ($p = .001$), especially in external rotation, upper limb function ($p = .001$) and in their emotional state ($p = .001$) including anxiety, fatigue and vigor following a 12-week TC exercise (n = 25) when compared to breast cancer self-management education (n = 23). Additionally, significant improvements in physical functioning ($p = .034$), mobility ($p = .017$), flexibility ($p < .001$), balance ($p = .001$) and social integration ($p = .014$) were observed in terminal cancer patients after undertaking an 18-week TC training course, compared to pre-course TC training (Hui, Cheng, Cheng, & Lo, 2008).

In addition to the investigation into physical outcomes, the effects of TC on psychological health and HRQL in cancer patients have also been assessed (Mustian et al., 2004; Eom, 2007; Sprod et al., 2012; Reid-Arndt, Matsuda, & Cox, 2012). In a pilot

study (Mustian et al., 2004), women living with breast cancer (n = 31) were assigned randomly to a 12-week TC group or a psychosocial support group to test differences in HRQL, using a 28-item HRQL scale known as the Functional Assessment of Chronic Illness Therapy-Fatigue (FACIT-F), and self-esteem using the Rosenberg Self-esteem Scale at baseline, six and twelve weeks. Significant inter-group differences were observed. Tai Chi practitioners demonstrated significant improvements in HRQL (p = 0.07) and self-esteem (p = 0.01) at the 12-week assessment, whilst the psychosocial intervention group experienced a decreasing trend in both domains. In addition to quality of life, other improvements in physical functioning, physical role limitations, social functioning and general mental health have also been reported in breast cancer survivors in a later study, as well as positive changes in biomarkers (Sprod et al., 2012). The researchers suggest that the improvement in HRQL in cancer survivors as a result of TC practice may be linked to the regulation of inflammatory responses and other biomarkers which are associated with side effects from cancer and its treatments. However, these results have not been consistent across all cancer groups with patients with gastric cancer failing to show significant improvements in depression, HRQL and immune markers after a 24-week TC self-help education program (Lee et al., 2010).

Studies in the field of TC and cancer are ongoing. One such study, sponsored by the University of California, is testing the effectiveness of TC on chronic insomnia amongst breast cancer patients compared with cognitive behavioral therapy (National Center for Complementary and Alternative Medicine [NCCAM], n.d.). Another RCT being conducted by the NCCAM is investigating the effect of TC on improving physical

fitness and endurance, reducing stress and increasing well-being in adult cancer survivors compared to groups undertaking aerobic exercise and on a wait-list.

Overall, current evidence indicates that TC has some potential health benefits as a supportive therapy for cancer survivors to improve physical and psychological function and HRQL. However, it is important to note that physical deconditioning, deteriorating disease, energy-sapping treatment and lifetime stressors leave cancer suffers and survivors with multiple special needs, so the effect of TC as a supportive cancer care should be evaluated beyond the cancer itself and involve a comprehensive perspective. The added improvements observed in the immune system, psychological well-being and sleep stability (Yeh , Mietus, et al., 2008; Yeh, Chuang, et al., 2008; Wang et al., 2004) may also have potential implications for the use of TC with cancer patients and therefore also warrant further investigation. However, clinical trials so far conducted are limited in their generalization due to a lack of a-priori power analysis and small samples. Further research regarding the potential benefits of TC in supportive cancer therapy is needed to evaluate the comprehensive therapeutic effect of TC.

2.4 Tai Chi and Psychological Well-being

Mental illness is a significant health problem affecting one in four of the world's population at some time during their lifetime. In Australia, the proportion of people suffering from long-term mental health problems doubled from 5.9% to 11% in the period from 1995 to 2008 (AIHW, 2009). Up to now, a great number of strategies have been implemented to try to curb this growing trend, one of which is exercise therapy. The positive effect of physical activity on mental health is well known (Craft & Perna,

2004; Humpel & Iverson, 2007) and has resulted in TC becoming an area of research interest in regard to mental health and exercise. Unlike most physical exercises, which are characterized by muscular force and exertion, TC incorporates slow, gentle movements with a total focusing of the mind combined with deep breathing, which results in the physical, psychological and spiritual benefits (Ospina et al., 2007). Previous studies, including a recent meta-analysis (Wang, Bannuru, et al, 2010) and several reviews (Sandlund & Norlander, 2000; Wang et al., 2004; Dechamps, Lafont, & Bourdel-Marchasson, 2007; Wang et al., 2009; Jimenez, Melendez, & Albers, 2012), have evaluated existing data in relation to TC and psychological well-being. These reviews concluded that TC has significant short- and long-term effects on depression, anxiety, stress, mood and other psychological variables.

Due to a high prevalence rate of depression reported amongst patients with chronic diseases (Frasure-Smith, Lesperance, & Talajic, 1993; Schleifer & Macari-Hinson, 1989), the effect of TC on depression has been investigated in patients with a variety of medical conditions. Wang and his colleagues conducted a series of studies on the effect of TC on depression amongst patients with different physical diseases (Wang et al., 2004; Wang, 2008; Wang et al., 2009; Wang, Bannuru, et al.,2010; Wang, Schmid, et al., 2010). These studies started with a pilot study involving patients with RA (Wang, 2008), wherein TC participants demonstrated significant improvements in depression (p = .003), using the Centre for Epidemiology Studies Depression (CES-D) Index, and HRQL (p = .01) after a 12-week TC intervention, compared to an attention control group only receiving wellness education and stretching. Based on this study, further studies conducted by the same research team reported

significant improvements in depression in patients with OA (p = .009) (Wang, et al., 2009) and those with fibromyalgia (p = .02) (Wang, Schmid, et al., 2010). Similarly, a significant positive effect of TC on reducing depressive symptoms was also reported in patients with CVDRFs (Barrow et al., 2007; Taylor-Piliae, Haskell, Waters, & Froelicher, 2006), clinical depression disorder (Chou et al., 2004), and again fibromyalgia (Taggart, Arslanian, Bae, & Singh, 2003).

This is an ongoing area of study, with the effects of TC on depression, diabetes and obesity currently being investigated by an Australia research team. In these studies, a special TC form known as KaiMai TC was designed specifically for depression, obesity and diabetes by Dr Xin Liu, a University of Queensland scientist ("Innovative UQ Tai Chi program treats depression, diabetes and obesity," n.d.). In the pilot study, the number of people with clinical depression (n = 50) was reported to drop by 40% with significant improvements in weight loss and blood glucose control after a three-month TC intervention. These preliminary unpublished findings provided support for conducting another larger study, the Mental and Metabolic Syndrome Innovative Lifelong Exercise (SMILE), which focuses on TC, depression and metabolic disease. This study has been funded by the National Heart Foundation and Beyondblue and is currently ongoing.

Anxiety is one of the most common mental health problems and impacts significantly on life, work and study, which makes this an important area of investigation in relation to TC. In a RCT with 76 elderly participants (Tsai et al., 2003), anxiety was assessed by the State-Trait Anxiety Inventory (STAI) in addition to blood pressure and lipid profile. Participants were randomly assigned to a TC group receiving

a 12-week TC exercise program tri-weekly or a sedentary life control group where usual lifestyle was maintained. After 12 weeks, the TC group demonstrated lower scores on both state and trait anxiety ($p < .01$), compared to the baseline, as well as significant reduction in blood pressure and cholesterol levels, while no improvements in the control group were observed. Another RCT (Galantino et al., 2005) was specifically designed to investigate the effects of TC and aerobic exercise on functional outcomes and HRQL in patients with human immunodeficiency virus (HIV) and/or acquired immunodeficiency syndrome (AIDS). Patients (n = 38) were randomized to one of three groups: TC, exercise, or control, and the Profile of Mood States (POMS) was used to assess psychological variables. The two intervention groups exercised twice weekly for 8 weeks, while the control group just maintained their normal daily activities. After eight weeks, significant improvements in confusion–bewilderment ($p < .001$) and tension-anxiety ($p = .005$) were observed in both intervention groups, as well as improvements in the overall health perception ($p = .04$) and overall functional measures ($p = .001$), compared to the control group. Although details related to the TC group specifically were not reported, it is worthy of note that patients in both intervention groups reported positive physical changes, enhanced psychological coping skills and improved social interaction after exercise.

In addition to studies on anxiety and depression, TC has been regarded as a strategy for stress reduction (McCain et al., 2008; Fransen, Nairn, Winstanley, Lam, & Edmonds, 2007; Taylor-Piliae, Haskell, Waters, et al., 2006; Li, Duncan, et al., 2001; Thomas, Treweek, Farmer, & Bushnell, 2011; Reid-Arndt et al., 2012). In a RCT conducted by an American research team (McCain et al., 2008), the effect of TC on

stress management was assessed in patients with HIV infection. Participants (n = 252) were allocated randomly to one of three 10-week intervention groups including cognitive–behavioral relaxation training (n = 65), focused TC training (n = 62), and spiritual growth group (n = 68), or to a wait-listed control group (n = 57). The Dealing with Illness Scale (DIS) was used to assess stress levels and coping patterns and the Impact of Event Scale (IES) was used to measure psychological distress at pre-intervention, post-intervention and at six-month follow-up. The results showed that patients in the relaxation and TC groups demonstrated significant treatment effects ($p < .001$, $p < .02$, respectively) on emotion-focused coping and improvements in overall HRQL, compared to the spiritual growth and control groups. Noticeably, the treatment effects on emotion-focused coping achieved by TC participants were maintained at the six-month follow-up. Other studies also reported the similar positive effect of TC on various populations, such as people with HIV (McCain et al., 2008), diabetes (Liu, Miller, Burton, & Brown, 2010), CVDRFs (Taylor-Piliae, Haskell, Waters, et al., 2006), healthy individuals (Li, Duncan, et al., 2001), and medical students (Thomas et al., 2011). However, Fransen et al. (2007) failed to find improvement in stress for patients with OA. This result might be influenced by exercise intensity (one hour twice per week) and low attendance of 61% in the TC intervention group.

The effect of TC on mood (affective) problems has been examined in four RCTs, eight non-randomised studies (NRS) and three observational studies since 1980 (Wang, Bannuru, et al., 2010; Jimenez et al., 2012), wherein the effects of TC on psychological variables, such as anger, positive and negative affect and life satisfaction were tested. The result showed that TC practitioners experienced decreasing levels of depression (*p*

< .05), negative affect ($p < .05$), and psychological distress ($p < .05$), while showing greater increases in all positive well-being variables, including positive affect and well-being ($p < .05$), life satisfaction ($p < .05$), and perceptions of health ($p < .05$) (Li, Duncan, et al., 2001b; Taylor-Piliae, Haskell, Waters, et al., 2006). Of note, the improvements observed in the TC group were sustained at the six-month intervention. In addition, Blake and Batson (2009) also found TC improved the mood ($p = .02$) and self-esteem ($p = .01$) of patients with traumatic brain injury. Similar findings were also reported by other studies conducted with patients living with medical conditions, such as attention deficit hyperactivity disorder (Hernandez-Reif, Field, & Thimas, 2001), the elderly with cardiovascular problems (Taylor-Piliae, Haskell, & Froelicher, 2006; Yeh et al., 2011) and healthy adults (Toda, Den, Hasegawa-Ohira,& Morimoto, 2011).

Apart from a few studies reporting no significant impact of TC on psychological health (Baron & Faubert, 2005; Barrow et al., 2007; Fransen et al., 2007), most systematic reviews suggest that TC has a therapeutic impact on psychological well-being, including depression, anxiety, stress, and mood in general, as well as other psychological problems (Wang et al., 2009; Rogers, Larkey, & Keller, 2009; Wang, Bannuru, et al., 2010; Jimenez et al., 2011). The underlying mechanism of these effects is not clear. It may be the result of the mutual influence between movements and improved physical functioning generated from TC or the increased social interaction experienced during TC practice. High-quality, rigorous and well-designed RCTs are needed to assist with further understanding the long-term effects of TC on psychological well-being and whether it has benefits over and above other forms of exercise undertaken by people with these health problems.

Collectively, the positive effects of TC on improving both physical and psychological health issues have been investigated broadly amongst people with a variety of medical conditions and its safety and efficacy in these situations also have been extensively documented. Consequently, TC is attracting a lot of attention from individuals who seek successful health management strategies as well as healthcare professionals and researchers who also wish to find strategies suitable to recommend to the public, not only to assist with the management and treatment of disease, but also to prevent illness and promote health.

2.5 The Role of Tai Chi in Health Promotion

Health promotion is "the process of enabling people to increase control over and improve their health" (McMurray, 2003, p. 24). There are numerous approaches available to maintain and improve health status, one of which is to keep physically active. This section will present a review of the literature in relation to the role of TC in health promotion through improving cardio-respiratory capacity, falls prevention, quality of life and self-efficacy.

2.5.1 Tai Chi and promotion of aerobic capacity

Aerobic capacity is the maximum capacity of the cardio-respiratory system to utilize oxygen. Assessment of aerobic capacity is undertaken by measuring the maximum amount of oxygen (VO_2 max) consumed during maximal exercise of a given activity, which is achieved by measuring the milliliters of oxygen used in one minute per kilogram of body weight (ml/kg/min) ("VO_2 max," n.d.). VO_2 max reflects the individual's physical fitness and is influenced by various factors. In terms of TC, it is

influenced by the duration, frequency, intensity and style of TC being performed, gender and individual differences. For example, a meta-analysis by Taylor-Piliae and Froelicher (2004) revealed maximum oxygen uptake during TC varies between 40% and 55%, depending on the style and duration of the intervention, and women may derive more positive effects than men (ES_{sm} = 0.65; Cl = -0.04). Also illustrated was that a greater improvement in aerobic capacity was observed in people performing the classical Yang style (108 postures) (ES_{sm} = 1.10; CI = +0.82, +1.38) over a 52-week intervention (ES_{sm} = 0.94; C = -1-0.06, +1.81), compared with sedentary subjects (ES_{sm} = 0.80; CI = +0.19, +1.41). Taylor-Piliae (2008), in an updated meta-analysis, concluded that long-term TC practice is effective in improving aerobic capacity, particularly for middle-aged and older adults. This may help to explain the negative findings of another systematic review (Lee, Lee, & Ernst, 2009), wherein the RCTs with TC interventions ranging from 12 to 16 weeks, with simplified styles of 5 to 15 movements, were reported to have no significant effects on VO2 max. Consequently, it could be concluded that when TC is performed routinely at a moderate intensity, as per the American College of Sports Medicine (ACSM) recommendations, it offers a useful aerobic-like exercise for people with heart disease and sedentary elderly individuals and also provides alternative exercise options for those who are reluctant to use more intensive forms of exercise, such as a treadmill or cycle.

2.5.2 Tai Chi and falls prevention

The prevention of falls and fall-related injuries in older people is a global health issue associated with the rapidly increasing numbers of the elderly in population. In

Australia it is estimated that more than one in three people aged 65 years or over fall once a year and falls account for 36% of the injury-related hospitalizations and one fifth of all fatal injuries (AIHW, 2008a). Fall-related injuries have resulted in direct medical costs being estimated at $19 billion (Stevens & Sogolow, 2008). This creates a significant challenge in developing effective and cost-efficient strategies to prevent falls and fall-related injuries in older populations. Assessing and reducing predictable risk factors are considered as the most effective approaches to prevent and reduce falls accidents (Stevens & Sogolow, 2008; Sherrington et al., 2008). Risk factors, such as poor vision, sleep disorders, health conditions and medication use, can be reduced by ensuring that medical attention is received for these problems, while other risk factors, such as poor lower extremities muscle strength and stability, balance and gait, and a fear of falling, can be managed through exercise. Exercise intervention, when used as a component of multifaceted interventions, has a significant impact on the rate of falls and falls prevention (Province et al, 1995; Lord et al, 2003; Sherrington et al., 2008). Currently, there are many community-based exercise programs available to older people to assist them to prevent falls whilst also maintaining the highest level possible of their independence. Tai Chi is one form of exercise, which has received more attention recently from both individuals and professionals due to its holistic focus and wide-ranging effects on variables, such as muscle strength, balance, postural alignment, and concentration (Wu, 2002). As a result, investigating the effects of TC on falls and falls prevention in the elderly have been the most frequent type of study undertaken in the area of TC and health in the past two decades (Li et al., 2011). Overall, a large number of studies, including a meta-analysis (Sherrington et al., 2008) and several

recent systematic and critical reviews (Verhagen et al., 2004; Li, Harmer, et al.,2004; Li, Fisher, Harmer, & McAuley, 2005; Li et al., 2011; Low, Ang, Goh, & Chew, 2009; Rogers et al., 2009; Maciaszek & Osiski, 2010; Leung, Chan, Tsang, Tsang, & Jones, 2011) have suggested that TC is effective in reducing and preventing falls by improving balance, muscle strength and flexibility and enhancing neuromuscular components related to quiet standing and gait.

The effect of TC on falls prevention has been tested in various studies. One often quoted study (Province et al., 1995) was a multi-centered study known as Frailty and Injuries: Cooperative Studies of Intervention Techniques (FICSIT), which was designed to test the effect of short-term exercise on reducing falls and fall-related injuries in the elderly. The study included eight independent RCTs in eight different locations around the USA and these trials varied in intervention strategies, durations and target populations. One of these trials in Atlanta, (Wolf et al., 1996) used TC as an intervention to test the effects of exercise intervention on reducing falls and frailty in the elderly compared to balance training and education. Relatively healthy and ambulant participants (n = 200) aged 70 years or over were recruited from local communities and assigned randomly to three groups: a computerized balance training group (n = 64), a TC group using a modified form with ten movements (n = 72); and an education group (n = 64) for a 15-week intervention. Outcomes including strength, flexibility, cardiovascular endurance, the ability to perform instrumental activities of daily living (IADLs) and psychosocial indicators were all measured pre-course, post-course and at the four-month follow up. Although no significant differences in these variables were noted at pre-course testing, the result reported that 40% of the total falls occurred in the

balance group and 34% in the education group, but only 26% in the TC group. In addition, a significantly reduced rate of falls ($p = .01$), systolic blood pressure ($p = .053$) and fear of falling ($p = .046$) were also observed in the TC group. Of note, nearly half of the TC participants chose to continue TC practice in a self-organized group after completing the study. This may be related to factors, such as the perception of positive health effects in both physical and psychological domains, as well as simple enjoyment of the activity and social interactions. Further to this, the same research team (Wolf et al., 2006) found in a later study that a 48-week TC training programme reduced fall occurrence in elderly adults aged 70 or over and significantly improved their chair-rise and cardiovascular performance when compared to those in a wellness education program.

Impaired muscle strength, balance and gait are also regarded as significant risk factors for falls (Shen et al., 2008; Woo, Hong, Lau, & Lynn, 2007; Maciaszek, & Osiski, 2010; Wolfson et al., 1996). Based on initial studies, in which improvements in physical function, one leg stance, instrumental activities, 50-feet walk and chair rise (Li, Harmer, McAuley, Duncan, et al., 2001; Li, Fisher, Harmer, & Shirai, 2003) were observed in TC practitioners, Li and his colleagues conducted further clinical trials in relation to falls (Li, Fisher, et al., 2004; Li, Harmer, et al., 2005). These revealed a significant reduction in falls ($p = .007$), proportion of fallers ($p = .01$) and fall-related injuries ($p = .03$) amongst the TC group after a six-month intervention. There were also improvements in balance variables using the Berg Balance Scale ($p < .001$), Dynamic Gait Index ($p < .001$), Functional Reach Test ($p < .001$) and the Single-Leg Standing Test ($p < .001$) in the TC group, while no changes were observed in the control group.

Of note, TC participants demonstrated a lower fear of falling ($p < .001$) and incidence of falls ($p < .001$) than another experimental group involving stretching exercises and the difference was maintained to the six-month follow up. These positive findings of improvements in balance and gait and reduction in falls and fear of falling were also supported by other clinical studies (Li, Devault, & Oteghen, 2007; Li, Xu, & Hong, 2008; Pereira, Oliveira, Silva, Souza, & Vianna, 2008; Song et al., 2010).

However, some studies failed to find a significant intergroup difference (Faber, Bosscher, Chin, & VanWieringen, 2006; Choi, Moon, & Song, 2005; Voukelatos, Cumming, Lord, & Rissel, 2007). In a RCT study conducted by a Netherlands research team (Logghe et al. 2009), patients aged 70 or older with a high risk of falling (n = 269) were assigned randomly to a 13-week TC intervention or usual care. Fall counts were collected monthly over one year and secondary outcomes including balance, fear of falling, blood pressure, heart rate at rest, forced expiratory volume during the first second, peak expiratory flow, physical activity and functional status were measured at three months and 12 months. At the 12-month follow-up, the result revealed that more falls were observed in the TC group than the control group (115 vs 90). However, it is important to note that there were a higher proportion of fall risk factors, such as previous falls, visual problems and comorbidities in the TC group than the control group, as well as a short-term intervention with a long break between the intervention and the 12-month follow up. Although some TC participants practiced TC at home during the follow-up period, only 21% of them practised for ten minutes or longer at a single session. These factors, combined with the presence of comorbidities and previous experience of falls may affect the interpretation of the result.

Collectively, there is growing evidence supporting the efficacy of TC on falls reduction and falls prevention by reducing risk factors, such as improving postural balance and gait and strengthening muscles. It is also important to consider that TC may also assist to reduce falls through the positive effects on other potential risk factors for falls such as flexibility, stability, knee extension (Audette et al., 2006; Choi et al., 2005) and sleep disorders (Li, Fisher, et al., 2004). Although long-term and regular TC practice is promoted as a safe and effective strategy to assist the elderly in reducing fall events, future studies on the style, training intensity and duration of TC need to be undertaken to confirm the most effective type of TC intervention.

2.5.3 The contribution of Tai Chi in promoting quality of life

Health-related quality of life is a multidimensional construct encompassing an individual's physical and mental well-being and their social relationships (Kamphuis et al., 2002). Also correlated with HRQL is self-esteem which is a significant indicator of health and ability to cope with illness (Carpenter, 1998). However, HRQL and self-esteem may be adversely affected by the process of aging and a variety of medical conditions (Schlenk et al., 1997; Li, Harmer, McAuley, Duncan, et al., 2001). Maintaining and improving effective physical and mental functioning contribute to improving HRQL. Tai Chi as an exercise form has been accepted widely as a health strategy to improve and maintain physical, mental and social functioning and there are many documented positive effects on enhancing HRQL and self-esteem in people with various conditions and the elderly (Mustian et al., 2004; Li, Duncan, et al., 2001; Li, Harmer, Chaumeton, Duncan, & Duncan, 2002; Ho et al., 2007; Lee, Lee, & Woo, 2009;

Kutner, Barnhart, Wolf, McNeely, & Xu, 1997). As previously discussed in the health care section, TC improved HRQL and self-esteem in breast cancer survivors, diabetics, pain sufferers and those suffering psychological problems (Mustian et al., 2004; Song, Ahn, Roberts, et al., 2009; Abbott et al., 2007; Wang, 2008), while other studies specifically focus on the benefits of TC in the aged population. One of the studies (Lee et al., 2009) involving older residents in a nursing home (n = 139) aged 65 years and over reported TC participants (n = 66) demonstrated significant improvements in the physical and mental components of HRQL ($p < .05$) after a tri-weekly TC program of 26 weeks duration, compared to a usual activity group (n = 73). Moreover, they also reported a high resident satisfaction ($p = .03$), which was significantly correlated with the improvement of HRQL ($p < .01$). Further evidence for a relationship between TC and increased self-esteem can also be found in other clinical trials (Li et al., 2002; Kutner et al., 1997), which reported improvements in overall self-esteem, including physical self-worth, physical condition, sport competence, body attractiveness and physical strength, although it failed to demonstrate an inter-group significance. This may be related to the different variations and measurements employed in these individual trials.

2.5.4 Tai Chi and enhanced self-efficacy

Self-efficacy is regarded as a person's estimate of their capacity to perform a specific task or their perceived control over the environment (Bandura, 1997). Self-efficacy is a crucial factor for both health and health behaviour and can be influenced strongly by many factors, one of which is health status (Brekke, Hjortdahl, &

Kvien, 2001). The older population and those with medical conditions encounter the loss of self-efficacy in varying degrees due to the decline of physical and psychological health which is often associated with their reduction in physical and social activity. Amongst a variety of strategies, exercise, including TC, is considered to be an effective approach to improve personal perceived self-efficacy. Due to the nature of TC, as a smooth, quiet, mind-concentrating and group-based exercise, TC provides an ideal approach to increasing self-efficacy by enhancing overall physical and psychological well-being (Li, Harmer, McAuley, Fisher, et al., 2001; Dechamps, Lafont, & Bourdel-Marchasson, 2007; Verhagen et al., 2004). This is illustrated in the Atlanta FICSIT trials (Wolf et al., 1996; Kutner et al., 1997) where less fear of falling and reduced falls amongst the TC group increased participant's confidence in controlling their own mobility and daily life activities, which, in turn, may have a profound impact on their self-efficacy. Similarly, the positive effects of TC on mental health, as discussed previously, could also assist individuals to improve self-efficacy by gaining confidence and a feeling of control over their bodies and the surrounding environment. The perceived improvements in physical, psychological and social capability, when undertaking TC, could also be one of the motivating factors for people continuing TC. For example, in one study, 87.5% of elderly TC practitioners decided to continue TC practice after the completion of the study due to the positive outcomes they perceived, such as less illness, better health, and social reward (Chen, Snyder, & Krichbaum, 2001).

2.6 Tai Chi and Social Capital

When the health of the community is viewed from a social perspective, it is referred to as social capital (McMurray, 2003). Social capital is defined as "the institutions, relationships, attitudes, and values that govern interactions among people and contribute to economic and social development" (Grootaert & van Bastelaer, 2001, p. 4). Research on the effects of social capital on physical and mental health has been studied since the nineteenth century illustrating a strong correlation between social connectedness and health at both individual and community levels (Kawachi, Kennedy, & Glass, 1999; Putnam, 2000; Ziersch, Baum, MacDougall, & Putland, 2005, Kawachi 2006; Giordano & Lindstrom, 2010; Pieter-Paul & Tampubolon, 2012; Giordano, Björk, & Lindström, 2012). The safety and efficacy of TC, combined with the rapid growth of TC users around the world, provides support for the potential integration of TC into the health care system as a strategy to promote community health (Wayne & Kaptchuk, 2008). It is therefore important to give some attention to the potential of TC to contribute not only to improving and promoting health but also to social capital.

The growth of groups and associations teaching and practising TC has seen an increase in the promotion and awareness of TC as an exercise choice. Although most TC associations practise the same philosophy originating from Taoism, the size, style, structure and capacity of the organizations vary from one to the other and there are differences in regard to the type of service provided to the community, particularly in regard to promoting healthy and sustainable communities and enhancing community capacity. For example, the International Taoist Tai Chi™ Society (TTCS) is

characterized as a health promotion charity, which aims primarily to promote and maintain health and transmit TC culture. In public health, the importance of social support for individual health and community well-being is increasingly recognized by health researchers and community health professionals and subsequently the value of social capital in community health promotion has been measured in different communities (Baum, Cooke, & Murray, 1998; Stone, 2001; Ziersch et al., 2005). An Adelaide community-based health promotion study conducted by Baum et al. (1998) appears to open the door in regard to measuring the value of social capital in community health promotion and evaluating its impact on individual and public health in Australia. However, little attention has been devoted to measuring and evaluating the role of social capital in a health promotion not-for-profit organisation, such as the TTCS. As an international non-profit organization, registered officially with state and federal governments, the TTCS provides a health service and social function to local residents by drawing people with various backgrounds and languages together to do exercise within a volunteer setting and, in doing so, assists in building a positive, trusting environment within the TTCS. In addition to this, in terms of a social support network, the TTCS raises money for both local and international charities and supports other branches internationally. However, there has been little attention given in the literature to evaluating the impact on social capital of health promotion entities, such as the TTCS, and their value to the community and its individuals. It is important to move beyond the concept that TC is just a type of exercise and to investigate the value of TC in terms of social capital and its ability to promote public health amongst individuals, the community and society.

2.7 Conclusion

In summary, based on existing evidence, the positive physical, psychological and social effects generated by TC have been investigated and documented in a wide range of populations with various medical conditions. Benefits include improvements in general health, physical functions, such as balance, flexibility and strength, decreased blood pressure and increased cardiovascular functions, reduced pain in chronic musculoskeletal conditions, enhanced immune response, reduced incidence of falls and the fear of falling, diabetic management, better quality of life, and improved psychological health in the form of reduced stress, anxiety, depression, and mood disturbances and social life. This literature review illustrated TC is an alternative, safe and enjoyable exercise for people with various clinical conditions, the elderly and those who are reluctant to do more strenuous forms of exercise. However, the small sample size, the effect of self-selection of small samples and the lack of reported effect sizes in the reviewed experimental studies might in some cases, compromise the value of these trials and the interpretation of the results reported. Of note, there are fundamental questions regarding TC that still remain unanswered, such as: who practises TC; what are their patterns of practice; what are the factors that motivate or prevent people to initiate, adopt, practise and maintain TC; what are their beliefs about TC; and what are their expectations and perceptions of the effects of TC on their health and well-being? Although these are basic questions, only two previous studies reporting the patterns of use of TC have been identified in the literature. These studies were each conducted in the United States and China (Birdee, Wayne, Davis, Phillips, & Yeh, 2009; Birdee, et

al., 2013). The American study (Birdee et al., 2009) utilised baseline data from the 2002 National Health Interview Survey (NHIS) and found people of Asian descent who were educated and living in Western or Northeastern US were more likely to be TC users, as well as people with musculoskeletal diseases, severe sprains and asthma. The Chinese study (Birdee, et al., 2013) was based on the Shanghai Women's Health study (SWHS) and Shanghai Men's Health study (SMHS) and reported people who were female, older, more educated, retired and suffering from chronic illnesses were more likely to practise TC. However, both studies used retrospective data obtained from broader health population studies rather than a survey designed to gather information specifically on TC. Another study by Giblett (2008a) did investigate the perceptions of Taoist Tai Chi™ (TTC) practitioners in Australia, although this study was conducted using interview and observation approaches and mainly focused on those who were suffering from significant physical health conditions, such as multiple sclerosis and cerebral palsy. However, it is of note that no peer-reviewed published papers on either the patterns of use of TC or practitioners' perceptions of its effects on health and well-being has been identified in a Western context outside of this current study.

The published studies reviewed here have predominately investigated the effects of TC on particular elements of physical and psychological health rather than its patterns of use and individual practitioners' perceptions of its effects in regard to their health and well-being. For this reason, this study aims to describe the characteristics of TC practitioners, more specifically TTC practitioners, and their patterns of practice. In order to better understand the perceived effects of TC, an additional aim of this study is to explore the practitioners' perceptions of its effects on either maintaining or

improving both their physical and psychological health and the difficulties and motivating factors they encounter when undertaking TC in Western Australia. The TTCS provides an ideal setting for such a study as it teaches a standardized, well-documented form of TC to a large local and international membership. This will allow the findings from a study of Western Australian practitioners to be generalized to the larger national and international population of TTC users.

CHAPTER 3 THEORETICAL FRAMEWORK

3.1 Introduction

This study is grounded in Bandura's Social Learning Theory (SLT) and its theoretical framework has acted as a guide throughout this study. This chapter provides a brief history of the development of the theory and a description of key concepts in its construct. In addition, the Health Locus of Control (HLC) and associated the Multidimensional Health Locus of Control (MHLC) scales, which are based on SLT (Wallston, Wallston, Kaplan & Maides, 1976), are also explained. The role of SLT in the study design and analysis and its relation to tai chi (TC) health promotion is outlined in this chapter as well.

3.2 Social Learning Theory

Social Learning Theory was first proposed by Albert Bandura (1977) with initial influences from Rotter (1954), Miller and Dollard (1945) and Vygotsky (1986). Bandura's theory emphasises the psychosocial dynamics influencing human behaviour in the context of society and strategies for promoting behavioural change. Bandura was to later expand this theory, which then became known as Social Cognitive Theory and was explained in terms of a triadic, dynamic, and reciprocal model in which behaviour, people and environment all interact with each other (Bandura, 1977, 1986). Among the personal factors considered in this model of behaviour are the individual's capabilities to symbolize behaviour, to anticipate the outcomes of the behaviour, to perceive efficacy in performing the behaviour, and how the individual self-determines and self-regulates

their behaviour (Bandura, 1997). Bandura's work on self-determination and self-regulation subsequently gave rise to his Self-Efficacy Theory where self-efficacy is described as a person's belief in their ability to succeed in specific situations (Bandura, 1997). More specifically, within the context of health and health behaviour, health educators and behavioural scientists have adapted Bandura's work to develop intervention techniques that influence individual perceived self-efficacy, thereby increasing the likelihood of health behavioural change. In line with this, the rationale for the use of SLT in this study was to provide a framework to guide the researcher in the study design and interpretation of the study's data in areas relating to:

- participants' motivations, barriers and expectations in regard to initiating and continuing TC;
- participants' health locus of control and its influence on TC practice;
- the predictive factors associated with TC practice patterns;
- how TC practice contributes to and influences participants' health and well-being; and
- successful strategies likely to promote TC practice amongst varying groups in the population.

Bandura (1977) viewed human behaviour as being determined by expectancies and reinforcement where outcome expectations and efficacy expectations, known as self-efficacy, are two essential but different types of expectancies, as shown below in Figure 3.1.

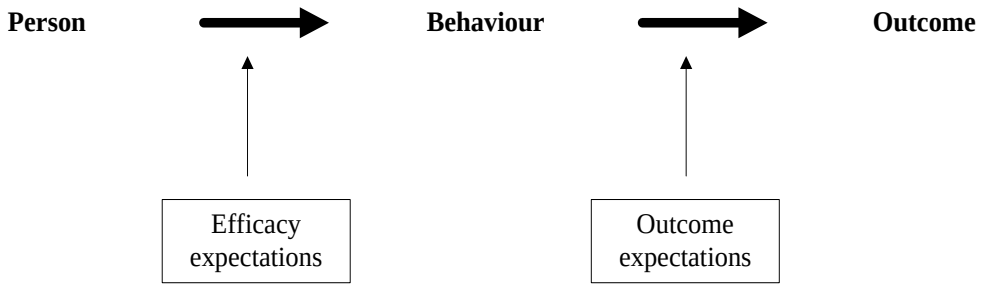

Figure 3.1. Diagrammatic representation of the relationship between efficacy expectations and outcome expectations.

Outcome expectations refer to the belief that a given behaviour will lead to particular outcomes, while self-efficacy is the belief in one's own competence or capacity to accomplish the given behaviour and produce the desired outcomes (Bandura, 1977, 1997). Bandura proposes that the combined influence of outcome and self-efficacy expectations can predict human behaviour and affective states within certain situations. For instance, people with high self-efficacy and positive outcome expectations are more likely to "foster aspirations, productive engagement in activities, and a sense of fulfilment" (Bandura, 1997, p. 21). However, self-efficacy is distinguished from outcome expectations by its differing elements (Bandura, 1997, 2006), as illustrated in Figure 3.2.

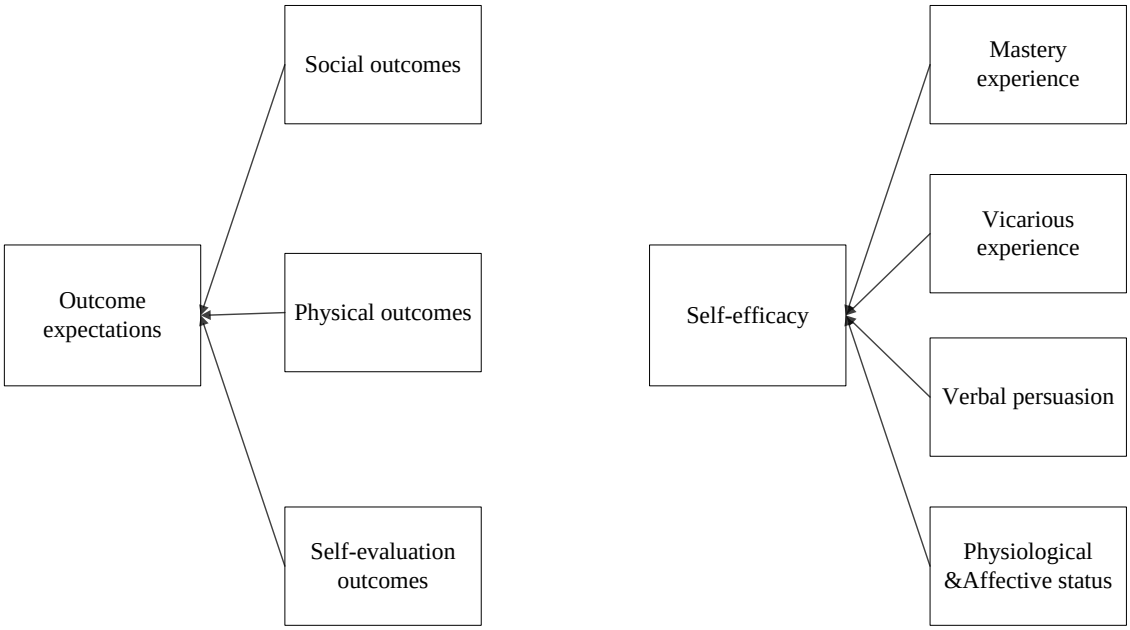

Figure 3.2. Compositions of self-efficacy and outcome expectations.

3.2.1 Self-efficacy

Within social learning theory, self-efficacy is an essential construct. Perceived self-efficacy not only influences individual behaviour, but also impacts on other behaviour determinants, such as goals, expectations, perceptions, and affective status in the context of society (Bandura, 2006). Bandura (2004) states that "the stronger the perceived self-efficacy, the higher the goals people set for themselves and the firmer their commitment to them" (p. 145). So far four sources, namely mastery experience, vicarious experience, verbal persuasion and physiological and affective status, as displayed in Figure 3.2, are identified in relation to self-efficacy for a specific behaviour (Bandura, 1997). *Personal enactive mastery experience* refers to the successful performance of experiences in the past and its subsequent effect on behaviour, where a successful experience would enhance individual perceived efficacy, and vice versa. *Vicarious experience* builds personal efficacy through successful modelled attainments and self-appraisal of capabilities. Tai Chi is commonly taught using a vicarious modelling experience. That is, people learn TC by first observing and then following and imitating TC instructors or senior practitioners. Therefore, during the process of teaching and learning TC, the influence of TC instructors on individuals through modelling is pivotal. *Verbal persuasion* in regard to individual capacities to perform certain behaviours is the third source influencing self-efficacy. As Taoist Tai Chi™ (TTC) is a group-based exercise, interpersonal interactions and persuasive suggestions from instructors or others during TC practice would influence positively or negatively on each participant's TC behaviour and attitudes towards TC itself. For instance,

encouragement from others is reported as the most important factor affecting TC initiation and adoption (Chen, Snyder, & Krichbaum, 2001) and assurance and inspiration from TC instructors is a facilitating factor for people to overcome difficulties in learning to continue TC practice (Giblett, 2008a). In addition, *physiological and affective status* can also improve personal efficacy perceptions through enhancing physical states and reducing negative emotion and stress levels (Bandura, 1997).

Amongst the four main sources of self-efficacy, verbal persuasion is considered to have a short-term influence on human behaviour, although it is easily used as a health promotion strategy, while personal direct practical experience is considered as having the most powerful impact on efficacy beliefs. However, as it is impossible and unnecessary for a person to experience everything themselves, vicarious experience through observing and modelling others become an essential approach to enhance perceived self-efficacy in people's everyday lives. Consequently others' successes are likely to create positively perceived efficacy in the observers (Bandura, 1977).

As an individual's self-efficacy plays an essential role in health promoting behaviour and has been considered to be an essential predictor of health behaviour (Hagger, Chatzisarantis, & Biddle, 2001; Hallam & Petosa, 2004; Baldwin et al., 2006; Kaewthummanukul & Brown, 2006; Hendriksen, Pettifor, Lee, Coates, & Rees, 2007; Blanchard et al., 2007; Dutton et al., 2009), the four areas outlined previously that relate to self-efficacy have been extensively investigated in an attempt to seek effective strategies to increase individual efficacy beliefs in order to facilitate the adoption and maintenance of positive health behaviours (Elbel, Aldana, Bloswick, & Lyon, 2003; Hallam, & Petosa, 2004; Jones, Harris, Waller, & Coggins, 2005; Blanchard, et al.,

2007; Marcus et al., 2007). A systematic review with a meta-analysis (Ashford, Edmunds, & French, 2010) examined 27 physical activity intervention studies extracted from 2105 papers to look for the most effective strategy to increase individual self-efficacy in promoting a healthy lifestyle and recreational physical activity. They found vicarious experience and feedback on past or others' performances could produce higher levels of individual self-efficacy, while others' persuasive suggestions, personal past mastery experience and barrier identification in performing exercise were associated with lower levels of self-efficacy. Consequently, when investigating the patterns of practice amongst TTC practitioners, the current study was influenced by the findings outlined by Giblett (2008a) in his qualitative study that vicarious experience, interpersonal interaction, TC practice environment, social persuasion and individual physiological and emotional status could play an essential role in TC initiation, adoption, practice and maintenance. This is particularly so for TTC because of its philosophy, unique teaching method and preferred group-based practice. In addition, Bandura's theory leads the researcher to hypothesise that individual experience in the early stage of TC learning could also influence their later patterns of practice. The researcher anticipates findings related to this will reveal areas where effective promotion strategies of TC as an exercise can be developed.

3.2.2 Outcome expectations

In social learning theory, another important construct is outcome expectations, which can be measured by using three main components: physical, social and self-evaluation outcomes (Bandura, 2004). As shown in Figure 3.2., *Physical outcomes*

reflect pleasant or aversive experiences as a result of engaging in physical activity whereas *social outcomes* refer to social approval and disapproval that is produced through interpersonal relationships occurring during physical activity. Finally, *self-evaluation outcome expectations* reflect an individual's perceptions of self-satisfaction and self-worth as a result of activity involvement. Due to individual differences in judgement and cognition, the importance of the three different aspects of outcome expectations vary from one person to another and can affect behaviour in either positive or negative ways. Positive expectations will motivate people to take certain actions, while negative expectations may impede people in taking any actions. The action being investigated in this study is that of TC practice. Therefore, investigating the factors associated with outcome expectations of TC is one of the main aims of this current study to better understand TC behaviour. This is particularly pertinent in relation to the extent individuals believe they have control over the events affecting them. This is referred to as Locus of Control (LOC) (Rotter, 1954; Bandura, 1997).

3.2.3 Health Locus of Control

The theory of LOC is commonly adopted when attempting to explain the differences in an individual's behaviour from the viewpoint of how their beliefs influence their personal ability to control events that affect them. Building on this, Wallston and her colleagues (1976) further developed the theory to specifically assess an individual's health beliefs in regard to the issue of who controls that person's health, themselves (internal) or other people and factors (external). This is known as HLC,

which can be measured by the MHLC scales. In addition, Wallston (1992) also proposed that a high internality would be associated with health behaviours amongst those who place a high value on their health. This is an important perspective to understand the population who are likely to adopt and maintain TC as an exercise, which, in turn, may assist in directing strategies for the promotion of TC.

In addition to self-efficacy and outcome expectancies, human behaviour is extensively regulated by its consequences (Bandura, 1977). The consequences could be health, social status, finance, social approval, physical appearance, self-worth and self satisfaction, and any other consequence based on individual understanding and interpretation. These consequences serve as either positive or negative reinforcing factors, facilitating or impeding people taking further actions. In the example of physical exercise, positive health outcomes could be positive incentives for people continuing their chosen exercise, while negative experiences may impede further exercise participation and adherence. It is anticipated that the investigation of reinforcement in the context of TC in this study will reveal the facilitating factors and barriers related to TC adherence, which will provide evidence for the development of effective strategies to assist people with maintaining long-term TC practice.

3.3 Conclusion

In adopting SLT as the theoretical framework for this study, TC behaviour amongst TTC practitioners in Western Australia was analysed from individuals' initial motivations and expectations in adopting TC, through to their health beliefs, perceived efficacy of TC, and facilitating factors and barriers in maintaining TC practice over a

long time period. The perceptions of the effects of TC on participant's health were also investigated. It is hoped that by describing the patterns of TC behaviour in this group-based exercise environment and within the context of SLT, important information regarding practitioner's beliefs and experiences of the effectiveness of TC will influence the development of effective and practical strategies to promote TC practice as a health behaviour.

CHAPTER 4 METHODOLOGY

4.1 Introduction

This chapter discusses the research methodology employed in this study. It provides a comprehensive description of the research design, the recruitment of participants, and the research methods adopted to collect, analyse and report the data. It also explains the processes related to the consideration and justification of the use of the qualitative and quantitative methods used in the study, in addition to the relevant ethical considerations.

4.2 Research Design

This study used a single-phase, mixed method, observational and descriptive design. Descriptive research aims to "observe, describe, and document aspects of a situation as it naturally occurs and sometimes to serve as a starting point for hypothesis generation or theory development "(Polit & Beck, 2008, p. 274). As a single data-gathering approach was not considered adequate enough to facilitate the breadth and depth of the investigation required for this research project, a mixed research approach incorporating a cross-sectional survey was implemented. The questionnaire integrated qualitative and quantitative data gathering methods, where the quantitative data were collected using Likert scales and closed-ended survey questions and the qualitative data were obtained from open-ended questions. By using different data types this enabled the researcher to approach the study from diverse perspectives in relation to the same phenomenon (Olsen, 2004) where open questions allowed validation of the

quantitative data collected and also permitted a deepening and widening of the understanding of the data and in this study. Consequently this enabled the researcher to better "understand the full complexity of a poorly understood phenomenon" (Polit & Beck, 2008, p. 196). This use of different data types in this context is referred to as triangulation (Denzin, 2009).

The popularity of Tai Chi (TC) in Western countries was considered by the researcher to be a multi-faceted phenomenon influenced by personal and environmental factors, personal health beliefs and social psychological aspects. Therefore, a quantitative data method was designed to access demographic characteristics of TC practitioners, their health status, the patterns of use of TC and beliefs about TC, in addition to their beliefs about control over their own health, whilst qualitative data were collected to gain an understanding of their expectations and perceptions in regard to TC's effects on their health and life throughout their period of TC training and practice. In using triangulation it was anticipated that this would assist in overcoming "the intrinsic bias that comes from single-method, single-observer, and single-theory studies" (Denzin. 2009, p. 313), as well as enhancing the validity of interpretation.

A cross-sectional survey questionnaire approach to collect data was considered a suitable method for several reasons. Firstly, questionnaires are considered a reasonably consistent, efficient and inexpensive method to obtain contextual information, particularly in an area where there is little known (Burns, 2000). Furthermore, questionnaires are considered to achieve better quality responses than interviews due to increased levels of confidentiality, anonymity and self-determination, especially where participants are able to respond in their own words at their own pace (Minichiello,

Axford, Sullivan, & Greenwood, 2003). This method is also advantageous for the researcher as it is a time efficient and an inexpensive method of collecting data from a large number of participants over a wide geographical area. A limitation does exist however when comparing the of use of open-ended questions in a survey form to data that might be collected from in-depth interviews, as a questionnaire is depersonalized and does not provide the opportunity for discussion between researchers and respondents. Despite this, the advantages to be gained by being able to seek responses from a large number of participants makes this data collection method a very suitable vehicle for obtaining greater insights to comprehensively understand TC phenomenon and TC behaviour.

4.3 Sample and Setting

A non-probability stratified sampling approach was used to select the sample for this study. As a setting that could offer a large number of people over a wide geographical area was sought, the International Taoist Tai Chi™ Society (TTCS) of Australia, a provider of Taoist Tai Chi™ (TTC) training throughout Australia, was approached in order to assist with contacting members. First contact was made formally via mail to the President of the Western Region Council to ascertain the interest of the Society in assisting with this study, prior to permission being granted by the National Management Committee. Permission was granted in February of 2010 from the TTCS (see Appendix A). Although TC is undertaken throughout Australia, due to the Society's large membership in Western Australia (WA) across both metropolitan and country areas, it was decided to use the WA membership as a representative sampling

frame for the study, which at the time, included five metropolitan branches and six country branches.

Western Australian membership at the time of the mail out consisted of 817 fully paid members considered by the TTCS to be of "good standing" and another 311 members whose fees were overdue between 1 and 3 months. As the researcher believed it was also important to include those members with overdue fees to ensure a broad range of responses, including from those who might have chosen to give up practising TC, a sampling frame was drawn from the 1128 members constituting both these groups. A published table (Bartlett, Kotrlik & Higgins, 2001) based on Cochran's (1977) formulas was used to calculate the required sampling frame that would yield an adequate sample size for this study. In accordance with the table, if using a sampling frame of 700, a final sample size of 249 would be required (where $p = .05$, $t = 1.96$), which equated to an expected response rate of 30-40%. This sample size was considered achievable and manageable for this study, considering the quantitative and qualitative nature of the data to be collected and the restrictions imposed by the time and financial resources available to the researcher. Consequently, the sampling frame was identified from the fully paid and overdue membership groups by choosing every alternate name on the membership lists, and when the lists were exhausted, returning to the beginning and choosing every 4^{th} name, until a final sampling frame of 696 names was reached.

4.4 Recruitment of Participants

Prospective participants consisted of those registered members of the TTCS of WA, either considered to be of "good standing" or "overdue" during January to July of

2010. The recruitment process was undertaken by mail with each envelope consisting of:

- a covering introductory letter from the TTCS-WA President (see Appendix B), in which the president explained the reasons for the Society agreeing to take part in the study and encouraged the members to complete and return the questionnaire;
- an information letter from the researcher (see Appendix C), in which the researcher illustrated the purpose and process of this study;
- the participant consent form and study survey questionnaire (see Appendix D);
- a "Personal Information" page (see Appendix E) including name and contact details for participants who wanted to take part in the draw for the cash prize or to receive a personal copy of the findings of this study; and
- a self-addressed stamped envelope, which aimed to minimize the participant's effort in returning the questionnaire.

When the individual labels with the names and addresses of potential participants were provided by the TTCS in WA in November 2010, the mail package was assembled under the supervision of a TC member from the Society to ensure the members' contact details remained confidential. In order to maintain members' confidentiality, a member of the TTCS Western Region Council committee then posted the six hundred and ninety six mail packages prepared on behalf of the researcher. If participants agreed to participate in the study, they completed the questionnaire and then returned it in the self-addressed envelope to the researcher. In addition, a poster (see

Appendix F) with the deadline for the return of the questionnaires and the researcher's name and contact was displayed at all branches to encourage the potential participants to return the questionnaire by the due date. Furthermore, the poster also provided a prompt to anyone who might have any questions to phone or email the researcher.

By the deadline in early January 2011, 382 valid questionnaires had been returned, excluding 26 questionnaires that were returned to the researcher due to invalid addresses and two cases where the researcher was notified that the potential participant had died. The sample size of 382 satisfied the minimum required sample size with a response rate of 54.9% being somewhat higher than the 30-40% expected.

4.5 Survey Instrument

The survey questionnaire (see Appendix D) was specifically designed for use in this study and included both Likert scale items and closed and open-ended questions. Closed questions were considered suitable to collect data related to demographic information as well as being easy to answer for participants. These questions were placed in a logical order to maintain the consistency of the data (Roberts, Anthony, Madigan, & Chen, 1997). Additionally, answers gave easily fitted categories and codes for computer analysis (Minichiello et al., 2003). Likert scale items, an approach which has been widely used to measure attitudes or analyse opinions (Minichiello et al., 2003), were employed to measure participant's general self-assessed health status, health beliefs and their perceptions regarding TC. Open-ended questions were employed to explore the participants' expectations and perceptions during the process of learning and practising TC.

The questionnaire was constructed in four sections. The first section, "Some question about your Taoist Tai Chi", consisted of 24 closed-ended and Likert scale questions relating to the patterns of use of TC most commonly practised and their experiences and beliefs about TC. The patterns investigated included the form, frequency, duration, location and time of practice. Reasons for commencing and ceasing TC, and participants' experiences as a TC practitioner within the TTCS, in addition to their beliefs about the effectiveness of TC were also investigated. The second section, "Some questions about your health", comprised seven questions to assess participants' health status, including self-assessment of general health, body mass index (BMI), self-reported diagnosed medical conditions, and participants' beliefs regarding perceived control over their health status. In the third section, "General information", eight questions were used to investigate demographic data, including age, gender, ethnicity, educational level, income, employment and marital status. The final section of the questionnaire, "Your comments about Tai Chi", included four open-ended questions designed to explore participants' perceptions regarding their expectations of TC, and the benefits and discouragements they may have experienced. To assist in focusing their answers on the benefits they perceived to be of primary importance, participants were asked to restrict their answers to the most important three benefits.

Questionnaire Design

During the design process, there were a series of technical issues that were considered when the questionnaire was constructed, including:

- grouping questions according to theme;

- using plain language;
- ensuring a smooth transition between questions and themes; and
- arranging the sequence of questions in logical order.

In the first three sections, six-point Likert scales were employed to develop questions investigating participants' experience of feeling a part of the Society (a six-item scale), general beliefs regarding TC (a 18-item scale) and self-assessed health prior to and after commencing TC practice. Likert items used a uni-dimensional scaling forced choice method, wherein all participants were required to make a decision on their level of agreement or disagreement with a statement. Each of the scale statements was rated on a 1-to-6 Disagree-Agree response scale, on which the rating scale responses were 1= strongly disagree to 6=strongly agree. Instructions related to the completion of each scale were included at the beginning of the relevant section.

Included in the second section were the six-point Multidimensional Health Locus of Control (MHLC) scales which were used to investigate the participant's health beliefs in relation to patterns of TC practice. The MHLC scales are a family of measures, consisting of four instruments, namely, Forms A and B for a healthy population, Form C for those with an existing health condition, and the God Locus of Health Control (GLHC) scale for the assessment of the relationship between religious beliefs and health. In order to better understanding TC behaviour and to compare the differences in the health beliefs between participants with and without chronic illnesses, two forms from the MHLC scales were employed. These were Form A for assessing healthy participants and Form C for those living with chronic conditions. Form A and C each consist of three six-item subscales, which are designed to measure Internality (IHLC), Powerful

Others Externality (PHLC) and Chance Externality (CHLC) (Wallston, 2005). Items in the IHLC, such as "If I get sick, it is my own behaviour which determines how soon I get well again" reflect the belief that an individual is responsible for their own health. Conversely, the belief that one's health is under the control of powerful others (e.g., doctors, nurses, family or friends) is reflected in items, such as "Having regular contact with my physician is the best way for me to avoid illness", which is a component of the PHLC. The CHLC subscales measure the extent to which one's health is determined by fate, destiny, or even chance, and is reflected in items, such as "Luck plays a big part in determining how soon I will recover from an illness". However, there is a slight difference between Form A and Form C in relation to the PHLC subscale. Instead of a single 6-item scale in Form A, the PHLC subscale in Form C is further divided into two, independent 3-item aspects: doctors and other people.

Since being published, the MHLC scales have been used widely in studies to understand and predict health behaviours in a variety of populations (Wallston, 2005), including three surveys at a nationally representative level (Norman, Bennett, Smith, & Murphy, 1998; Steptoe & Wardle, 2001; Grotz, Hapke, Lampert, & Baumeister, 2011). These studies show a positive relationship between HLC and health behaviour. For instance, Steptoe and Wardle's (2001) European Health and Behaviour Survey involving 7115 students from 18 different countries found students with high IHLC were more likely to exercise, eat breakfast regularly, intake fibre, brush their teeth daily, limit salt intake and avoid fat intake, while those with high CHLC were more likely to smoke, consume alcohol, and have an unhealthy diet. In addition, Kuwahara et al. (2004) also found IHLC scores in people exercising were significantly higher than

non-exercisers. According to the normative MHLC data identified by K.A. Wallston and B.S. Wallston (1981), a mean score of 25.55 was calculated for IHLC, 19.16 for PHLC and 16.21 for CHLC amongst healthy adults, and 25.78 for IHLC, 22.54 for PHLC and17.64 for CHLC for patients with chronic illnesses. These statistics allow other researchers to "compare their findings with large-sample norms and to set up cut off points for dividing samples into high and low groups" (p. 200). Generally, the MHLC scales are considered to be "moderately reliable", with Cronbach alphas between .60 and .75 and test-retest stability coefficients ranging from .60 - .70 (Wallston, 1993). They are able to be used in research studies without the permission of the authors.

4.6 Pilot Study

In order to test the initial validity and reliability of the questionnaire, and review the data collection processes, a pilot study was conducted in October 2010 at one of the TC classes held at one branch of the TTCS. A total of 32 questionnaires were handed out in the class, and participants were also asked to record the time taken to complete the questionnaire and any difficulties they experienced in understanding any of the questions.

Twenty-nine questionnaires were returned within two weeks. On average, the questionnaire took participants about twenty to twenty-five minutes to complete, although two people who had provided a large amount of written information in answer to the open-ended questions and, consequently, took longer than this average time. The structure of several questions was refined, although the content remained the same.

Additional written directions on how to complete questions, the formatting of the MHLC scales was also undertaken in an attempt to prevent errors with participants completing the wrong scale.

The pilot questionnaire as a whole returned a high internal consistency of .85. Furthermore, Cronbach's alpha for the 18-item Form A and Form C of the MHLC scales were calculated separately, showing .70 and .76, respectively. For the 18-item scale investigating participants' beliefs regarding TC, the Cronbach's alpha was .92.

4.7 Data Collection

Posters were designed to encourage potential participants and were provided, with a covering letter from the TTCS president, to each branch president to prompt the survey responses. In order to receive any questions and feedback, phone calls were also made to each branch president at the second and third week by the researcher.

Participants were encouraged to ask any questions of the researcher and her supervisors if they wished and were also told that it was impossible to remove the information they had supplied if they decided to withdraw from the study as their responses were anonymous. Data collection was completed on 16th January, 2011 and the TTCS President was informed formally by mail at this same time.

4.8 Data Analysis

Quantitative data collected from this study were analysed using the Predictive Analytics Software (PASW) Statistics 18® for Windows (2010) and qualitative data were analysed using content analysis. Techniques for analysing data included:

- parametric and non-parametric tests for descriptive data;

- factor analysis for beliefs regarding TC;
- regression analysis for the MHLC scales; and
- content analysis for open-ended questions.

An effect size, if required, was calculated as recommended by Cohen (1988). All *p* levels lower than .05 in this study was considered significant. Effect sizes were calculated in accordance with the test used. Cohen's *d (1988)* was used to measure effect size for *t* test, with *d* of .20 being considered small, .50 medium and .80 large, while Person's correlation coefficient (*r*) was used for correlation, with r^2 of .1 as a small effect, .3 medium and .5 large. In multiple regression, effect sizes was measured by Cohen's f^2, with a suggested small size of f^2 of .02, .15 for medium and .35 for large. Each of these analytical techniques is discussed in more detail in the following section.

4.8.1 Analysis of descriptive data using parametric and non-parametric tests

Descriptive data, including demographic characteristics, health background of participants, patterns of use, and reasons for the people to commence, continue or give up TC, were analysed using frequency, percentages, and either mean (*M*) and standard deviations (SD) or median and interquartile ranges (IQR) depending upon normality. The results are presented in either tables or graphs and discussed.

Missing values were scattered amongst different questions. The questionnaire involved a wide range of questions and the number of missing values involved in a single question ranged from .5% to 6%. Therefore, as suggested by Roth (1994), in consideration of the potentially negative impact of missing values in the whole data set,

a “pair-wise deletion” technique was adopted in order to preserve information and data integrity to the maximum extent.

The determination of the use of either parametric or non-parametric tests was based on the assumption of normality using a visual Normal P-P plot. Normality is an assumption that “each variable and all linear combinations of the variables are normally distributed” (Tabachnick & Fidell, 2007, p. 78) and this assumption is generally required to be tested prior to conducting data analysis in most statistical methods. However, in accordance with Allen and Bennett’s (2008) suggestion, as the sample size in this study was larger than 30, a small to moderate deviation in normality was not considered of concern. If the normality was severely violated, however, the associated non-parametric tests were performed.

Independent samples *t* test or its non-parametric equivalent the Mann-Whitney U test was undertaken to test the statistically significant difference between two sub-groups of the sample, such as male and female groups, and those with and without chronic conditions. The results were reported using *M*, SD, T, degrees of freedom (*df*) and significance in normally distributed; or mean rank, number, *U* and z where non-parametric tests were performed. Prior to reporting the findings from any independent samples *t* test, the assumptions of normality and homogeneity of variance were tested and effect sizes were calculated for both parametric and non-parametric tests.

The mean difference for self-assessed health status between pre and post commencement of TC was examined by a two-tailed paired samples *t* test. The result was reported with *M*, SD, 95% Confidence Interval (CI), significant value (*p*) and effect

size (*d*) and then presented in histogram graphs to allow visual comparison of the changes in the self-perception of health status across both time points.

In order to compare the difference among three or more groups, such as the relationship between the amount of attendance at a TTC club, the involvement in social events and the duration of TC practice and participants' feelings about being part of the Society, a one way between group or Kruskal-Wallis One-Way ANOVA was performed depending on normality assumptions. Levene's statistic (Levene, 1960) was examined for the assumption of homogeneity of variance.

4.8.2 Analysis of the Taoist Tai Chi efficacy scale

Construct validity for the 18 item instrument within the survey, designed to investigate the efficacy of TTC, was measured using exploratory factor analysis (EFA). Factor analysis (FA) is a statistical technique that has been widely applied in the social sciences, particularly in psychological research since its development by Charles Spearman in 1904 (Fabrigar, Wegener, MacCallum, & Strahan. 1999). The goal of FA is to estimate construct validity by grouping questions, to develop theories by investigating potential latent constructs amongst numerous variables and to reveal any underlying correlations among observed variables (Thompson, 2004). The factors produced through this technique can be used to attain a conceptual understanding of these variables by producing meaningful and interpretable groupings.

There are two major types of FA, confirmatory factor analysis (CFA) and exploratory factor analysis (EFA). Confirmatory factor analysis is commonly used to test an existing model or hypothesis. Conversely, in EFA, where no pre-designed model

or pattern is present, one seeks to identify underlying constructs amongst measured variables and summarize the correlated data. So EFA is regarded as "a data-driven approach" (Fabrigar et al., 1999, p. 277). As one aim of this study was to specify the latent conceptual constructs that may underlie the 18 variables in Question A23, which were used to investigate participants' perceptions of TTC as a health activity, EFA was considered the most appropriate. Prior to undertaking EFA, several methodological issues including assumptions are considered. These include sample size and selection of subjects, normality, factor extraction procedure, and meaningfulness of criterion. These are now discussed in the context of the current study.

Sample size

Sample size is an important consideration when conducting EFA. It is acknowledged that a small sample is more likely to be less reliable when testing correlation coefficients (Tabachnick & Fidell, 2007). Comrey and Lee (1992) indicate that 50 cases is a very low sample size, 100 poor, 200 fair, 300 good, 500 very good, and 1000 excellent. However, sample size should not be considered in isolation as the numbers of variables, factors and communality values are also of importance (Mundfrom, Shaw, & Ke, 2005). According to Mundfrom et al.'s guideline, the higher the ratio of variable-to-factor and the number of factors, the more cases are required. Conversely, the lower the communalities, the larger sample size required. For instance, where communalities range widely from .2 to .8 with a good criterion level (e.g., K 0.92), and if three factors are extracted, a minimum sample size of 80 is required if the level of the ratio of variable-to-factor is 5. If two factors are retained, then the sample

size required reduces to 60 cases. In this study, this criteria were applied during analysis to estimate the suitability of sample size.

Normality

In FA, although a normal distribution of variables can enhance the factor solution (Tabachnick & Fidell, 2007), violation of normality is not a great cause for concern in FA as:

(a) Violation of normality only has a modest effect on factor solution as it leads to underestimation of factors (West, Finch, & Curran, 1995);

(b) "Tests of Normality can be quite sensitive to even trivial departure from normality" (Allen & Bennett, 2008, p. 197);

(c) "Factor analysis is fairly robust against violations of the normality assumption" (Allen & Bennett, 2008, p. 197);

(d) Rotation technique is used to identify the latent constructs. When using this technique: "Less attention is focused on these concerns (normality) in Rotation-technique EFA application, even when the Pearson product-moment matrix is the basis for analysis" (Thompson, 2004, p. 121); and

(e) It is desirable that TTC participants hold a general positive understanding about TTC after commencing TTC practice; therefore, one would expect to result in skewing of the data.

Taken all together, violations of the normal distribution of data collected from the 18 variables under study would not be of significant concern when conducting EFA.

Outliers

Outliers are outlying scores on variables in relation to statistics. The existence of even a small proportion of outliers in a data set will influence statistical interpretation in a large study sample (Thompson, 2004). The source of outliers is diverse, including random errors and systematic errors (Roberts et al., 1997). Specifically, these errors include entry or coding errors, misunderstandings about how data is to be collected and recorded, or too overly positive or negative perceptions experienced by participants. As some errors can be detected and corrected, hence, it is an important statistical procedure for researchers to identify the source of outliers. For the typing and coding errors, checking for any out-of-range data was used to correct all errors and to ensure that the data has been read or typed accurately, while for the unusually extreme scores, it depended on the judgement of researchers. If the researcher believed that the outlying scores were an error that was incongruous with other answers, it was reasonable to remove them from the data set. On the other hand, if it simply appeared to be a different perception from other participants, the score was kept to reflect the variation in reality. Univariate outliers were detected using a boxplot graph generated in PASW. The variation in the data was demonstrated graphically by a line (the median) surrounded by a box, in which values that exceed 2 box lengths were considered as outliers and those that exceed 3 box lengths were extreme cases. Once they were detected, a close examination of the outliers was performed case by case.

Model-fitting procedure

Once exploratory factor analysis has been conducted, selecting an appropriate mathematical model underlying the EFA is necessary. Principal axis factoring is mainly used to uncover an underlying structure of a set of variables (Allen & Bennett, 2008). It

is also less sensitive to the violations of normality and produces a solution that has factors orthogonal to each other – that is, each factor has no loading on subsequent factors – they are discrete (Thompson, 2004). In addition, communalities were examined when determining the number of factors and suitable sample size for the EFA. If the sample is over 250 cases and there is a mean of communality of .60 or over, "either the Kaiser or Scree rules will yield an accurate estimate for the number of true factors" (Steven, 2002, p. 390). To attain an appropriate number of factors and increase interpretability, a mean communality value of .60 was used in this study.

Factor extraction procedures

Selecting the number of factors from the data set is determined by both statistical calculations and how the researcher wishes to present and interpret their findings. The reliability and interpretability is the core in processing and determining the number of factors. A combination of graphic and non-graphic methods, eigenvalue-greater-than-1 rule and scree test, was used in this study to determine the number of factors.

Once the number of factors was decided, specific variables that might form each given factor were examined and determined by rotated factor loadings. In health science research, orthogonal rotations methods, including Varimax, Equimax and Quartimax, are commonly used rotation techniques to produce uncorrelated factors (Allen & Bennett, 2008). All these methods have been installed with PASW. Orthogonal rotation was deemed the sensitive and suitable method as this would allow the researcher to clearly interpret the possible latent structures underlying the variables being investigated.

In processing the factor rotation, varimax rotation was set up to achieve a better, simpler structure.

A factor loading is the "Pearson correlation between the variable and the factor" (Stevens, 2002, p. 393). A large factor loading indicates the factor has a statistically significant effect on its given variables and further produces meaningful structures in the interpretation. There is a wide range for a factor loading, ranging from .10 to .90, in which .10 is the default in PASW. In such a large range, setting up an appropriate loading threshold is necessary in order to reduce meaningless variables and increase interpretability. Comrey and Lee (1992) provide a guideline regarding factor loading values, in which a loading with .71 or higher is excellent, .63 very good, .55 good, .45 fair and .32 poor. However, there is no gold standard for factor loading or cut off. In a meta-analysis with a total of 803 factor analysis studies, an average level of factor loading of .32 was reported and the most common threshold for a cutoff value was .40 (Peterson, 2000). On a practical perspective, a factor loading of .40 has been considered as substantial and .50 has been considered as significant (Floyd & Widaman, 1995).

In addition, sample size is another rule of thumb about factor loading cut-off (Stevens, 2002). The larger the sample size, the smaller the factor loading required. Apart from factor loadings and loading cutoff values, the number of variables in a single given factor is an essential element to assist with determining how many factors should be extracted. In each factor, at least three variables loading on a given factor are highly recommended for the reliability of the factor construct (Hatcher, 1994, p 73), but more variables would be expected to be loaded in each factor to attain an informative interpretation. Although less than three variables in a given factor with a high loading is

acceptable by some scholars, in this study, to increase reliability and interpretability, only factors with three or more components were accepted and interpreted. Following consideration of all factors mentioned above, a loading of .45 was set for the loading threshold in PASW. This meant only loadings with values above .45 would be presented on the table of rotated factor matrix as meaningful variables.

Naming factors is a process that labels the factor structure and assists in understanding and communicating the concept associated with the factor to the reader. There are three approaches available: descriptive, causal and symbolic (Rummel, 1970). As the intention of EFA in this study was to reveal any latent structure underlying the 18 question scale investigating participants' general beliefs about TC and then to classify the extracted factors, descriptive names were used to name the emergent factor constructs.

In summary, EFA with principal axis factoring and varimax rotation was conducted to specify the underlying construct of an 18-item scale in this study. The standard to determine the number of factors using EFA was based on: 1) a moderate sample size, N > 300; 2) a mean communality of .60; 3) the eigenvalues-great-than-1 rule; 4) a factor loading cutoff value of .45, and at least three variables in an extracted factor.

4.8.3 Analysis of the MHLC scales

Multiple regression analysis was performed in this study to investigate participants' health beliefs as a predictor for TC practice. Health beliefs were represented by scores from the MHLC scales, which were considered as independent

variables (IVs), while TC behaviours were the dependent variables (DVs). These DVs included frequency of TC practice, TC adherence and frequency of attendance at TC clubs and whether or not they practised TC outside of club sessions. Prior to running and interpreting the results, several assumptions were evaluated to enhance the accuracy and reliability of the regression model and ensure its application to other populations. These included sample size, normality, outliers, multicollinearity, and the normality, linearity and homoscedasticity of residuals.

Sample size is an important consideration in obtaining a reliable regression model. According to Green's (1991) rules of thumb, two simple rules are available for calculating a minimum acceptable sample when testing the overall fit of a regression model. These are $N \geqslant 50 + 8m$ (where m is the number of independent variables) for general fit and $N \geqslant 104 + m$ for testing individual predictors. In this study, both were calculated simultaneously and reported.

Two kinds of outliers were examined: outliers in regression solutions and outliers in variables. The first refers to cases with a large value of residuals in the solution, which can be detected by standardized residuals using PASW. Standardized residuals with a range of ± 3.3 at p value of .001 were acceptable for this study (Tabachnick & Fidell, 2007). Extreme residuals were removed once detected. The second type of outlier may be either univariate or multivariate. Univariate outliers are cases with extreme values and were handled as previously mentioned in EFA (p. 79). Multivariate outliers, which are described as cases "with unusual combinations of values across two or more predictor variables" (Allen & Bennett, 2008, p. 178), were detected here by using Maximum Mahalanobis Distance with PASW. When a

Mahalanobis Distance was larger than a standard chi-square value ($\alpha = .001$), indicating the presence of multivariate outliers, the case was removed from subsequent regression analysis.

Multicollinearity refers to a linear relationship between independent variables (Allen & Bennett, 2008). The existence of the relationship makes it difficult to accurately estimate the regression coefficients and poses a threat to the regression model. The examination of multicollinearity can be tested by Tolerance and Variance Inflation Factor (VIF) statistics produced by PASW (Field, 2009). A relatively high Tolerance ($> .02$) or a low VIF index (<10) is acceptable and was used in this study to interpret the validity of the final findings in the regression model.

Normality, linearity and homoscedasticity of residuals were assessed simultaneously by a visual inspection of a residual scatter plot graph. An absence of any clear patterns in the graph indicates the assumption is satisfied (Allen & Bennett, 2008). However, when bearing in mind the small effect of normal distribution in regression analysis, Field (2009) considers the presence of any abnormal distributions to be acceptable. Therefore, the violation of normality in this study is not a cause for concern in the multiple regression analysis.

Finally, the presence of independent errors was examined using the Durbin-Watson test. In a regression model, Field (2009) indicates that the residuals of any two observations should not be correlated or dependent in order to obtain a fit model and a value of Durbin-Watson test ranging between 0 and 4 is acceptable. These suggested parameters were used in this study. In conclusion, the assumptions of regression mentioned above were examined prior to interpreting the final result.

4.8.4 Analysis of open-ended questions

Four open-ended questions were designed to explore participants' perceptions regarding:

- expected outcomes from undertaking TTC;
- TTC effects on health and well-being; and
- barriers they encountered during TTC practice.

Once these data were gathered, content analysis was chosen to facilitate an understanding of the perceptions of respondents. Content analysis is described as "a research technique for the objective, systematic, and quantitative description of [the] manifest content of communications" (Berelson, 1952, p. 18), which "provides new insights, increases a researcher's understanding of particular phenomena, or informs practical actions" (Krippendorff, 2004, p. 18). As one of five common scientific tools in qualitative research, content analysis has been widely used in a variety of disciplines to transfer a wide range of symbols into understandable and meaningful interpretations.

There are diverse forms of communication available to investigate human perceptions, one of which is the production of written materials. In this study, open-ended questions were employed as a vehicle to understand the phenomenon of TTC as experienced by the participants in the form of written text. The written text passed messages from participants to the researcher and then these messages were extracted from the written form through coding by following a transfer process. By breaking down a text, a large amount of information is deconstructed. Deconstruction is the breaking down of text into small, measurable coding units, such as a word or words,

a paragraph, or a theme for interpretation. The coding process, known as selective reduction, is "the central idea in content analysis" (Wright, 2008, p. 4) as it impacts profoundly and directly on the final interpretation and research findings; hence, a detailed plan constructed in advance is necessary to ensure reliability, accuracy and consistency in interpretation (Krippendorff, 2004). Here, a coding strategy was constructed prior to undertaking the content analysis.

Creating codes, categories, subthemes and themes **"**No content analysis is better than its categories, for a system or set of categories is, in essence, a conceptual scheme" (Berelson, 1952, p. 39). Many content analysis studies have developed their individual and unique categories as they emerge from the text. In this study, the classification of qualitative data involved four stages: codes, categories, subthemes and pre-designed themes.

Codes have been used often with theme categories in content analysis (Budd, Thorp & Donohew, 1967) and are accepted as the smallest segment of data unit for content analysis. It is usually considered that a word-compound or a set of words is the basic unit in content analysis (Berelson, 1952). Therefore, the *codes* were the basic unit of analysis in this study, which were created based on the response of participants. These codes could be either a set of frequent words appearing in the given text or a summary of meanings in a phrase. In this study they normally consisted of two or more words, such as "improved balance" and "make social contacts". As the codes were mainly based on some specific words in the given response from participants, it reflected the accuracy and objectivity of interpretation of the given text (Budd et al., 1967). C*ategories* were the collection of codes similar in concept. The categories within

a similar concept were grouped together to formulate a *subtheme*. For instance, codes, such as maintaining or improving balance, improving posture, walking stability or better coordination, could be classified under the category “To improve balance” and then placed under the subtheme “To improve physical function”. All these three classifications were determined partly by the understanding of the text through repeated reading to gain an intuitive understanding about the text and partly by previous readings of the literature, which assisted the researcher to acknowledge existing classifications and frameworks. This also provided clues to conceptual categories and assisted the capture of codes that existed in the data source.

Noticeably, the coding process was based on the existence of a code rather than the frequency of a code. That is, no matter how many times the same or similar code appeared within one participant’s answers, it was only counted once. For instance, when one respondent commented that the benefits of TTC practice were “less back pain” and “less leg pain”, it could only be coded once under the code “pain relief”. By doing this, the researcher believed that the existence of a code would better accurately reflect how TTC practitioners gained benefits in each category and was used in preference to frequency coding.

The themes in this study, however, were pre-designed and were based on an expected relationship between themes, subthemes and categories that were derived from the open-ended questions and knowledge in the relevant fields. From a research point of view, the theme, to some extent, acted like a hypothesis and the determination of the themes was based on the researcher’s knowledge, literature review and taking into consideration the research questions. Specifying a theme in advance is a common

approach when using content analysis. It helps the researcher to focus on the crucial parts of the problem with less distraction and also has the added advantage of making the process of coding itself less time-consuming (Budd et al., 1967). For example, in the second open-ended question "Please describe the three main benefits you have experienced as a result of doing TTC", three main themes were predesigned to meet the research questions and analysis needs. They were physical benefits, mental health benefits and social benefits. Under the themes, there were subthemes, categories and codes which emerged from the data. Prior to creating the themes, the definition of the theme was written down to guide which data in the text was, and was not to be, included. Despite these advantages, there are limitations in using this approach, where predesigned themes may restrict the process required to gain new insights into the phenomenon being investigated. However, the researcher endeavoured at all times to remain open to this possibility whilst continually reflecting back on the data as it was read, coded and categorised. By doing this, the integrity of the data was achieved and maintained.

It is accepted universally that words are a rich vehicle for human beings to express their feelings and experiences. Moreover, the expression is influenced significantly by education levels and an individual's preference. If restricted only to the exact words or similar forms in a given text, meaningful information may be missed and this could lead to incorrect results and interpretations. As a result, a combined method was considered for use in this study where the comments were coded based on exact words or similar forms of words extracted from the participants' response, or the meanings of a phrase, which were inferred from the statements based on the researcher's understandings. Due to the requirement of understanding and frequent

reviewing of a large number of written responses, a hand-based coding was undertaken in preference to a computer software analysis program. This process is described by Krippendorff (2004) as enabling the "highly developed human capability of reading, transcribing, and translating written matter" (p. 14). Reading is word processing, in which researchers are able to judge and process information in a text and then create methods to store this information based on research intent and individual preference. Moreover, judgment is a unique human brain activity. How to distinguish different concepts from the same words and then to interpret it is at the discretion of reader's understanding and judgment. Admittedly, however, hand-based coding could be limited by the competence of researcher. As more than one reader could effectively minimize the risk of incorrectly interpreting a text leading to wrong conclusions, a small proportion of the sample of data was checked by the researcher's supervisor. Additionally, where the researcher was unsure regarding an interpretation, the supervisor's advice was sought for verification, which assisted with reducing mistakes in understanding and interpretation.

Data languages

During the coding process, an essential step is to code data by data languages. A data language is a descriptive process by which researchers formalize categories, variables, notations and transcripts in a computer-readable form and then formulate to just one analytical system (Krippendorff, 2004). Consequently, information can be organized and mediated with empirical data that is measurable and computable. There are two forms of data language employed in this study; one of them is a dendrogram.

A dendrogram, or tree-like diagram, was used to present the process of formalizing themes, subthemes, categories and codes as data language and as an aid to visualise the useful concepts embraced in the qualitative data when comparing classifications. Krippendorff (2004) states that "Trees are basic to the recoding of linguistic representations and conform to one of the earliest theories of meaning" (p. 165) and normally consist of one terminal value and several branching values. In this current study, formalizing the mass of information using a tree diagram, or dendogram, was organized upwards from codes, categories to subthemes and then these emerged subthemes were classified into one of the three pre-designed themes, as shown in Figure 4.1. In consideration of the large numbers of codes, the codes were not presented in the tree graph.

In this study, the terminal value was represented by the open-ended questions from the data collection instrument, whilst branching values consisted of three levels based on the responses given. With respect to those levels, level 1 consisted of pre-designed themes; level 2 were the subthemes that were built from like-categories; and level 3 were the categories emerging from codes extracted from respondents' answers. For example, we might nominate a Level 1 pre-designed theme as "physical benefits" in anticipation of the responses to the second question "Please describe the three main benefits you have experienced as a result of doing Taoist Tai Chi". If participants answered "improved my balance" and "I am more mobile in getting around", it was coded first at level 3 into the categories "improved balance" and "improved mobility" respectively and then grouped into a Level 2 subtheme named "improved physical function" under the pre-designed theme "physical benefits".

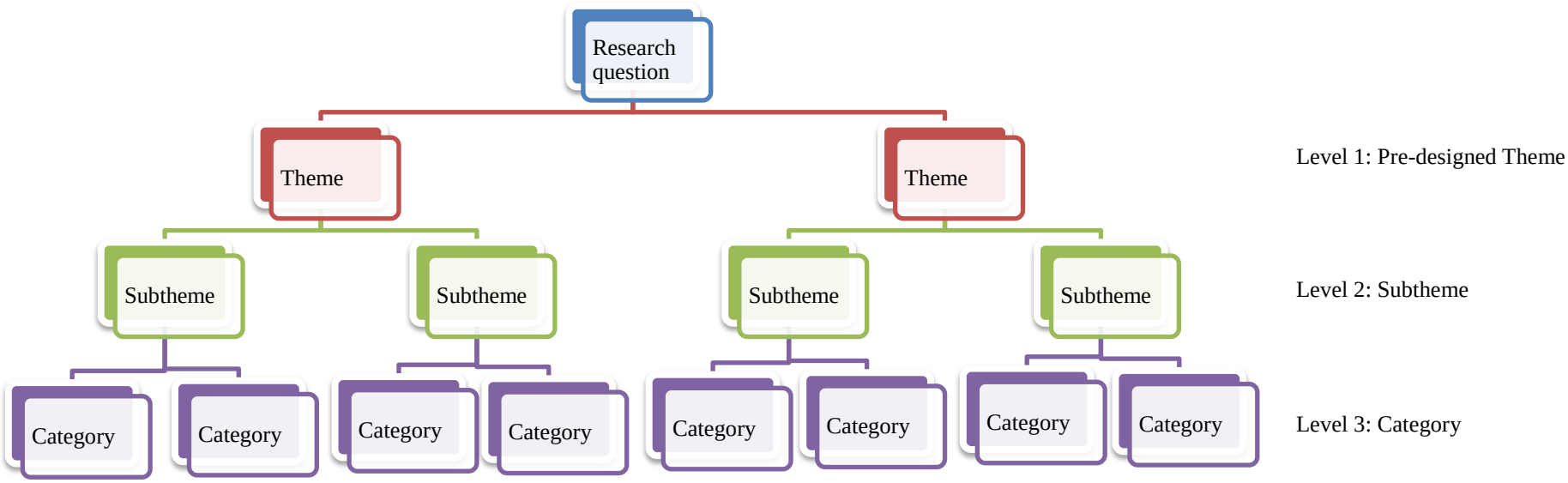

Figure4.1. Tree representation of the coding process

During the process, tense was addressed in this study related to a specific situation a participant was in. Specifically, a verb with present tense was an action with a destination, while a verb with past tense was considered to infer something that has happened. For example, “improving balance” meant that respondents expected to improve their balance by doing TTC while “improved balance” reflected their balance had been improved. This rule was utilized throughout the whole process to ensure consistency and coherence.

Another data language used was tabulation. Once the responses to open-ended questions were coded they were then entered into PASW for subsequent statistical analysis using tabulation, the most common statistical analytical technique in content analysis. This was used to facilitate the reporting and presentation of the frequency of each category that appeared in each theme by using graphs. The statistical figures provide a clear image of the prevalence of each specific topic and might be either implicit or explicit to the final interpretation.

Irrelevant information It is not realistic to expect that every comment or content is appropriate for coding as irrelevant information could generate errors and then affect final findings. All responses were examined and systematically coded but irrelevant information was not included. Irrelevant information was defined for the purposes of this study as answers given by respondents that were not related to the question being asked and unidentifiable data due to poor handwriting, which combined had only a small number of cases (n = 42) counted.

In summary, the content analysis of the qualitative data from the open-ended questions was conducted using the following procedure:

- Step 1: repeatedly reading to help general understanding of the text;
- Step 2: pre-designing conceptual themes based on understanding of responses and literature review;
- Step 3: manually writing down of the codes that appeared frequently;
- Step 4: formulating categories by grouping similar codes together;
- Step 5: grouping the emerged categories into subthemes;
- Step 6: placing the subthemes under the pre-designed themes;
- Step 7: entering data into PASW according to categories; and
- Step 8: the tabulation of the frequency of categories and the presentation of the data in a dendogram.

The systematic use of the coding technique throughout the content analysis effectively sustained the accuracy, consistency and coherence of analysis.

4.9 Rigour and Trustworthiness

Validity and reliability of a study are major criterion used to evaluate its quality. As this research employed mixed methods, the validity and reliability in regards to both quantitative and qualitative research needs to be addressed. However, due to the difference in nature between the two research methodologies, it is necessary to discuss how the rigour of each individual method is achieved whilst also addressing how the concurrent elements of the two methods and their resulting data are combined (Teddlie & Tashakkori, 2009).

When describing the rigour of quantitative research, researchers are predominately concerned with the validity and reliability of a study. Validity refers to

"actually measuring what the researcher says he is measuring while reliability means repeatability with consistency of results" (Budd et al., 1967, p. 66). In the quantitative paradigm, validity and reliability are more likely to rely on the quality of the instrument employed to build stability, replicability, accuracy and generalisablility (Golafshani, 2003). However, in qualitative research, as it adopts mainly a naturalistic approach to explore, understand and explain phenomena in specific settings, validity and reliability is considered in terms of trustworthiness. The validity and reliability principles are known as credibility, dependability and transferability, which reflects the processes related to the translating and transferring of data rather than the instrument itself (Patton, 2002). Consequently, validity and reliability in the qualitative paradigm is, to a large extent, influenced by the researcher's perceptions, understanding and capability, as well as study intents and assumptions. Due to the differences and characteristics mentioned above, different strategies were used to enhance and strengthen its rigour during the research design, data collection and analysis, and interpretation according to the paradigm employed.

Another important issue that arises is the way in which validity and reliability are described. In the quantitative research paradigm, due to the nature of the statistical method, validity and reliability are treated separately. However, in qualitative research, reliability is not a separate issue from validity, but "a particular type of threat to validity" (Maxwell 1992, p. 288). Thus, the concept of reliability is encompassed and emphasized together with validity rather than considered separately. Based on these considerations, the validity and reliability in the quantitative and qualitative segments in this study are discussed individually.

4.9.1 Reliability and validity in quantitative data

Quantitative researchers attempt to derive data through measurable variables, so the reliability and validity of the instrument employed is at the core when evaluating the quality of quantitative research. Reliability refers to the consistency, stability and generalizability of the instrument or measurement procedure employed, while validity is the degree to which an instrument measures what it is supposed to measure (Polit & Beck, 2008). How this study satisfied the criteria of reliability and validity is now described.

In evaluating validity, one of the primary concerns is whether the content of the survey instrument used is representative, comprehensive and accurate (Burns, 2000). To ensure this is addressed it is important to examine face, content and construct validity of the questionnaire. In this study, the content and construction of the questionnaire was designed in consultation with the researcher's supervisors, considering all important structural details, such as categorisation of questions into different sections and the use of the correct vocabulary in each question. Furthermore, in order to obtain more comprehensive and accurate TTC-related information, a panel of senior members from TTCS in WA was assembled by the Society to examine the questionnaire, in particular those questions relevant to TTC patterns of use, to ensure all relevant aspects were covered appropriately. Additionally, an anonymous colleague review was undertaken by two members from the Faculty at Murdoch University School of Nursing and Midwifery. They were asked to complete the questionnaire and then provide feedback on whether the questionnaire was clear, understandable and easy to complete. All these

processes were undertaken prior to the pilot study and the feedback resulted in a series of revisions to improve the understandability of the questions and the transition between questions and sections. In addition to the above strategies, construct validity of the questions measuring HLC was achieved by the use of the MHLC scale, a widely used scale with established reliability and validity.

In addition to validity, reliability is another crucial aspect for consideration in the development of a good and efficient measurement tool. On evaluating the internal consistency of an instrument, coefficient alpha is a widely accepted and used criterion. A level of Cronbach's alpha above .80 indicates an instrument is very reliable although .70 is generally considered acceptable for most research purposes (Allen & Bennett, 2008). In the pilot study, an alpha of .85 was obtained for all Likert scale items for the questionnaire as a whole and .70 or above was achieved for each of the individual scales, which indicated good internal consistency of the questionnaire. Furthermore, close supervision throughout the research process from the supervisor assisted with maintaining the consistence and stability of this study.

Furthermore, as discussed previously, a high agreement on the design of the questionnaire was obtained by detailed discussion with the researcher's supervisor and the involvement of senior TTC society members during the period of developing the questionnaire, which limited, to a maximum extent, the errors of the measurement and enhanced the instrument's accuracy.

4.9.2 Trustworthiness in qualitative data

Like quantitative researchers, qualitative researchers also strive to achieve a high standard of rigour. However, due to the differences in the two paradigms, the terminology describing how this rigour is achieved is not considered interchangeable. In qualitative research, rigour is referred to as "trustworthiness". Several different frameworks have been discussed in the literature as criteria for ensuring trustworthiness in qualitative research, although the gold standard is generally considered to be outlined by Lincoln and Guba's work from 1985 and in 1994 (Polit& Beck, 2008). In Lincoln and Guba's framework (Lincoln & Guba, 1985; Guba & Lincoln, 1994), several criteria are suggested to develop trustworthiness: credibility, dependability, transferability, confirmability and authenticity. These criteria are now discussed in relation to the qualitative inquiry component of this study.

Credibility

Credibility plays a crucial role in the validity of qualitative research and is concerned with the meanings of specific events and the behaviour and perceptions of the people who are engaged in conducting the research. Without credibility, the validity of the results produced by a qualitative study is less reliable (Maxwell, 1992).

Firstly, descriptive accuracy is emphasized by most qualitative researchers as the key to enhancing credibility because "description is the foundation upon which qualitative research is built" (Wolcott, 2009, p. 27). In this study, description and interpretation of the data were based on the participants' responses rather than the

researcher's assumptions. A well described and systematic coding process described previously (p. 87) was adopted.

The coding process exemplifies this application throughout the content analysis. For instance, the majority of codes were derived using the respondents' own language and conceptual expressions, making interpretation clear, simple and recognisable. In addition, the avoidance of syntactical ambiguity in data language also ensured the consistency and coherence of interpretation. For example, a coding indicator, although employed from the respondent's description, was a single word or a two-word phrase rather than an excerpt of a sentence, greatly reducing the possibility of syntactical ambiguity. In doing this, apart from improving credibility, this process also respects the reality and authenticity of participants' intentions, beliefs, perceptions and values, as much as possible.

Secondly, theoretical understanding, which is essential in qualitative research, goes beyond description and interpretation and reflects the extent of abstraction of the content and phenomenon being studied. This study was grounded in social learning theory as identified in the Health Locus of Control Theory (Wallston, Wallston & DeVellis, 1978). For example, with the exception of the exploration of the health beliefs, the participants' outcome expectations of TC, perceptions of the effects of TC on health and well-being, and barriers, potential and existing, were investigated in open-ended questions. The classification of the data, interpretation and inferences extracted were constantly related back to the theory and their relationship to the different beliefs outlined in the model. This was undertaken with the intention of then exploring the findings in the context of understanding individual health behaviour within a societal

setting. This study used a dendrogram as data language to present the process of coding that was organized from categories through subthemes and themes to research questions. In this sense, the extracted coding units were all linked back to the Social Learning Theory framework adopted for the study.

In addition to this, credibility was further upheld by the use of triangulation in space, person and method. Although there is a debate regarding the application of statistics in qualitative research (Barbour, 1998), some researchers, including this researcher, believe that statistical representation, such as triangulation, can be useful in both the implicit and explicit interpretation of the findings. As Patton (2002) states "Triangulation strengthens a study by combining methods. This can mean using several kinds of methods or data, including using both quantitative and qualitative approaches" (p. 247). The sample was recruited from either rural or metropolitan areas in WA, using a wide range of participants aged from 14 to 88 years. Included were not only those who continued to practise their TC at the clubs, but also those whose memberships had expired in the last three months. Tabulation with percentage frequency was also utilized to summarise categories drawn from each open-ended questions, which allowed the researcher to compare the findings with other results from within this study and other studies in this field.

Finally, the design of the questionnaire, including the research aims, instrument and methodology, was reviewed by supervisors, senior national and state TTC members and senior researchers prior to piloting. Consequently, a good consensus on the definition of categories and naming of codes between the researcher and supervisor was attained to ensure trustworthiness in this study. As Berelson (1952) commented "[if]

there is high agreement on the definition of the relevant categories; there is little difficulty in achieving validity in content analysis data" (p. 169).

Dependability

Dependability, also known as auditability, refers to the consistency and stability of data, and is referred to as reliability in quantitative research (Polit & Beck, 2008). In this study, dependability was established by using a fully developed codebook during the coding process and maintaining careful research notes. Research notes documented comprehensively all decisions and processes, including reduction of the data and selection of analytical techniques, in addition to meticulous tracking of the research process throughout the study. Furthermore, the consistency of data was also achieved by repeated examinations of such items as raw data, data reduction products and research notes throughout the whole research period. These strategies were essential to obtain consistency and stability in developing trustworthiness.

Transferability

Transferability is parallel to generalisability in the quantitative paradigm and refers to the extent to which the conclusion extracted from this study would extend to other situations and populations in different places and times (Calder, Phillips, & Tybout, 1982). Compared with its role in quantitative research, transferability in qualitative research is more likely to be influenced by the specific circumstances in which it is undertaken. Therefore, it is important to consider the context in which the study is based.

The randomisation of selecting participants in this study was reflective of the membership of TTC groups and TTC practitioners throughout Australia. The

representative nature of the sample allows generalization of the findings to either other members of the TTC society who were not directly involved in this study or quite possibly to other TC groups nationally and similar exercise groups as well. However, having said that, transferability may vary and be less predictive than that in quantitative research due to the differences in perspective, purposes and time as Maxwell (1992, p. 293) stated:

> *[It] takes place through the development of a theory that not only makes sense of the particular persons or situations studied, but also shows how the same process, in different situations, can lead to different results.*

Confirmability

Confirmability is concerned with whether the data truly reflects the information provided by participants and whether the researcher's interpretation accurately expresses participants' thoughts, view and voice (Polit & Beck, 2008). Therefore the researchers' neutrality or at least the bracketing of their beliefs is an important step in achieving confirmability when examining a particular phenomenon. This involves the researcher acknowledging any personal biases or assumptions associated with the topic. I have a Chinese background where TC is often undertaken daily as a public health measure. It is therefore important that in acknowledging this, I, as the researcher, am able to separate any bias or existing beliefs, such as expecting participants to benefit from TC. Bracketing was achieved through a reflexive process examining my personal beliefs and expectations and by discussion with my supervisor to ensure my interpretation was not influenced. Qualities that I encouraged in myself and my work to assist with this process included being self-critical, self-aware and curious, adopting an openness to new ideas and a willingness to be wrong, in addition to being precise and

organised in my analysis (Hamill & Sinclair, 2010). Confirmability is also ensured by codes which are derived from participants' own answers and conceptual beliefs. In using open-ended questions in a questionnaire, problems associated with this, such as the interviewer directing the participant, can be avoided, allowing respondents time to reflect on their responses.

Authenticity

Authenticity is the last criteria to be considered in Lincoln and Guba's framework (Guba & Lincoln, 1994). It reflects how "qualitative researchers fairly and faithfully show a range of different realities in the analysis and interpretation of their data" (Polit & Beck, 2008, p. 748). The criteria were upheld in this study by ensuring interpretation was based on the participants' responses rather than the researcher's assumptions, as mentioned in the previous credibility phase. During the data generation, deriving coding units from the respondent's description further respects the reality and authenticity of participants' intentions, beliefs, perceptions and values as much as possible. Furthermore, allowing participants over one month to return the questionnaire allowed them ample time to contemplate their answers to the questions. This provides participants the opportunity to express their opinions and perceptions realistically.

4.9.3 Conclusion

In summary, validity and reliability were addressed by ensuring the study:

- was grounded in an appropriate theoretical framework;
- was piloted prior to implementation;

- incorporated accurate description and interpretation based on the participants' responses rather than researcher's assumptions;
- was conducted in a setting representative of TTC practitioners in Australia; and
- utilized appropriate statistical methods which were triangulated in space, person and methods that employed peer review to obtain consensus on definition of category and naming of codes.

4.10 Ethical Considerations

Ethics approval to conduct this study was obtained from the Murdoch University Human Research Ethics Committee (approval number 2010/189). Throughout the study the processes undertaken ensured the anonymity and confidentiality of participants.

Mail-out of the information letter, questionnaire and reply paid envelope was undertaken using names and addresses supplied by the TTCS. To protect confidentiality of the membership details, the envelopes were pre-printed by the Society with the names and addresses of the members. Envelopes were then filled by the researchers in the presence of a TTCS official, who was then responsible for posting the questionnaires. All participants were given an information letter (see Appendix B) explaining the purpose and process of the study. A consent form was not required. When participants agreed to take part in this study, they returned the questionnaire to the researcher. The returned questionnaires were kept in a locked filing cabinet in the researcher's office to ensure confidentiality of the information. In addition, the "Personal Information" page with name and details, submitted by participants who

wished to go into the cash prize draw or receive feedback on the study's findings, were stored separately from the questionnaire to ensure anonymity of the data. The electronic data was entered into the researcher's personal computer, protected by a password to which only the researcher had access.

In order to increase the response rate of questionnaires in this study, participants were offered an incentive, with the opportunity to be included in the draw for a $150 cash prize and the prize was drawn on 15th December 2010. The prize was won by a participant from regional Western Australia who provided their bank details so the cash prize could be deposited into their account. Once transfer was affected, these details were destroyed. All data related to this study is being stored in password protected electronic files and a locked office cabinet for a minimum period of 5 years after which time it can be destroyed in accordance with Murdoch University ethical procedures.

CHAPTER 5 FINDINGS FROM AN ANALYSIS OF THE QUANTITATIVE DATA

5.1 Introduction

Chapter five presents the results from the quantitative data collected in this study. They are reported together with the results of the appropriate statistical test as discussed in the previous chapter and are presented in five sections:

- characteristics of the sample;
- patterns of Taoist Tai Chi™ (TTC) practice;
- social functions and volunteer activity within the TTC society;
- predictors of patterns of TTC practice; and
- participants' beliefs regarding Tai Chi (TC) as a physical activity and their experiences of being a member of the TTC society.

5.2 Characteristics of the Sample

The characteristics of the sample include five aspects, namely the demographics of the participants, motivations and barriers to TC practice, the information source for TC, participants' health background and their health beliefs.

5.2.1 Demographic characteristics

There were 382 TC practitioners from the International Taoist Tai Chi™ Society (TTCS) of Western Australia (WA) taking part in this study and their demographic characteristics are shown in Table 5.1. The majority were Australians (67%) with a Caucasian background, aged from 14 to 88 years with a mean age of 61 (SD ±11.8), with 75% aged over 55 (22% men and 78% women) and 42% over 65 years (18% men and

82% women). There were 3.5 times more female TTC practitioners than males and half of the sample held a university qualification (51%). Nearly half of the sample (47.4%) was retired, in which the majority (82%) were female, and 64% of them were living with their families or partners. The majority of respondents (65%) had a household income range over $35,000 with a very small proportion (3%) belonging to the lowest income group (under $6.000).

Tai Chi practitioners from 10 Western Australian TTC branches were sampled in this study. Nearly 70% of the respondents were from metropolitan branches with the largest percentage (34%) of participants belonging to the Fremantle branch, as shown in Table 5.2, whilst the largest proportion of country members were from the Geraldton branch (13%). Response rates at each branch were considerably higher from metropolitan areas than that of country areas.

Table 5.1
Demographic Data of the Study Participants (n=382)

Sample characteristics	Category	Percentage (n)
Age (year old)	<25	0.3% (n=1)
	25-44	8.2% (n=31)
	45-59	33.9% (n=129)
	60-74	45.8% (n=174)
	>75	11.8% (n=45)
Gender	Female	78.2% (n=298)
	Male	21.8% (n=83)
Nationality	Australia	67.1% (n=255)
	UK	21.8% (n=83)
	Other	11.1% (n=42)
Ethnicity	Caucasian	95.3% (n=362)
	Asian	2.6% (n=10)
	Other	2.1% (n=7)
Education background	No formal education	N/A (n=0)
	Under Year 9	6.3% (n=24)
	Year 9-11	19.9% (n=76)
	Year 12 or TAFE	23.1% (n=88)
	University qualification or over	50.6% (n=193)
Marital status	Married or living with a partner	64.0% (n=244)
	Divorced or separated	15.2% (n=42)
	Widowed	12.1% (n=46)
	Single	8.7% (n=33)
Employment status	Retired	47.4% (n=180)
	Full-time	27.9% (n=106)
	Part-time	16.1% (n=61)
	Casual	5.5% (n=21)
	Unemployed	2.1% (n=8)
	Student	1.1% (n=4)
Household Income	Under$ 6.000	1.7% (n=6)
	$6.001-35.000	33.8% (n=122)
	$35.001-80.000	37.7% (n=136)
	$80.001-180.000	23.8% (n=86)
	Over $ 180.001	3.0% (n=11)

Table 5.2
Percentage of Responses from Each of the Taoist Tai Chi™ Society Branches in WA

Area	Branch	Number of participants (%) (N = 382)	Membership at each branch [a] (N = 1128)	Representation of responses from each branch (%)
Metropolitan areas	Fremantle	129 (33.8)	367	35
	Stirling	44 (11.5)	132	33
	Bayswater	43 (11.3)	151	28
	Maddington	43 (11.3)	159	27
Regional country	Geraldton	48 (12.6)	146	33
areas	Albany	33 (8.6)	120	28
	Rockingham	12 (3.1)	--[b]	--[b]
	Narrogin	8 (2.1)	53	15
	Busselton	4 (1.0)	--[b]	--[b]
	Broome	3 (0.8)	--[b]	--[b]
Missing data		15 (3.9)		

[a] The total number of TC members at each branch in western regions.
[b] Data unavailable.

5.2.2 Motivations and barriers of Tai Chi

The reasons respondents reported for enrolling in TC classes varied from expected physical benefits to social interests, and multiple reasons were common, as shown in Table 5.3. Participants chose more than one reason. The top three most common reasons were: to improve physical health (75%), to seek a suitable exercise (67%) and for relaxation purposes (46%). In addition, seeking general improvement in well-being (28%) and energy levels (27%), or to satisfy their interests or curiosity in TC (27%) were also common reasons. One in five went to a TTC club for social interests or after being encouraged by their family or friends to learn a new form of exercise. Interestingly, 36% of participants attended TC to gain psychological health benefits.

Other reasons were given by only two respondents and included one participant who took part in TC because "my chiropractor said I would see him less if I took up TC (female, 38)" with another TC participant commenting they just wanted "to do something for myself".

Table 5.3
Frequency of Reasons that Motivated Respondents to Commence Tai Chi (N = 382)

Reasons	Per cent (n)	Rank
Physical health benefits	74.7 (n= 284)	1
A "suitable" type of exercise	66.6 (n= 253)	2
Relaxation benefits	46.1 (n= 175)	3
Psychological health benefits	35.8 (n= 136)	4
Improve well-being or fitness	28.2 (n= 107)	5
Improve energy levels	27.1 (n= 103)	6
Curiosity	27.1 (n = 103)	6
Social interests	22.6 (n= 86)	7
Encouraged by friends and family	18.4 (n= 70)	8
Other	0.5 (n= 2)	10

After completing their first TC ("Beginner's") class, the majority of respondents (86%, n = 325) in this study carried on their TC practice by enrolling in a continuing class, with only 9% (n = 35) choosing to stop TC. A small proportion (5%, n = 18) were, at the time of the study, enrolled in Beginner's classes. Reasons that influenced participants to carry on or give up after completing Beginner's classes were explored.

Facilitating factors that motivated people to enrol in a continuing class varied widely, from physical benefits to personal experiences, as shown in Figure 5.1. The two

main motivators reported by respondents were: wanting to further improve their TC skills (94%) and pursue more health benefits (82%), followed by experiencing enjoyment (67%) and the “good feeling” it gave (57%). It is necessary to distinguish “enjoyment” from “a good feeling”. Briefly, the researcher considered enjoyment as "a positive affective response to the exercise experience that reflects generalized feelings, such as pleasure, liking, and fun" (Casper & Stellino, 2008, p. 97), while “a good feeling” refers to a positive experience related to how participants felt about themselves when doing TC. In addition, social rewards and the effect of TC on stress and anxiety reduction were also main reasons for people to maintain TC practice.

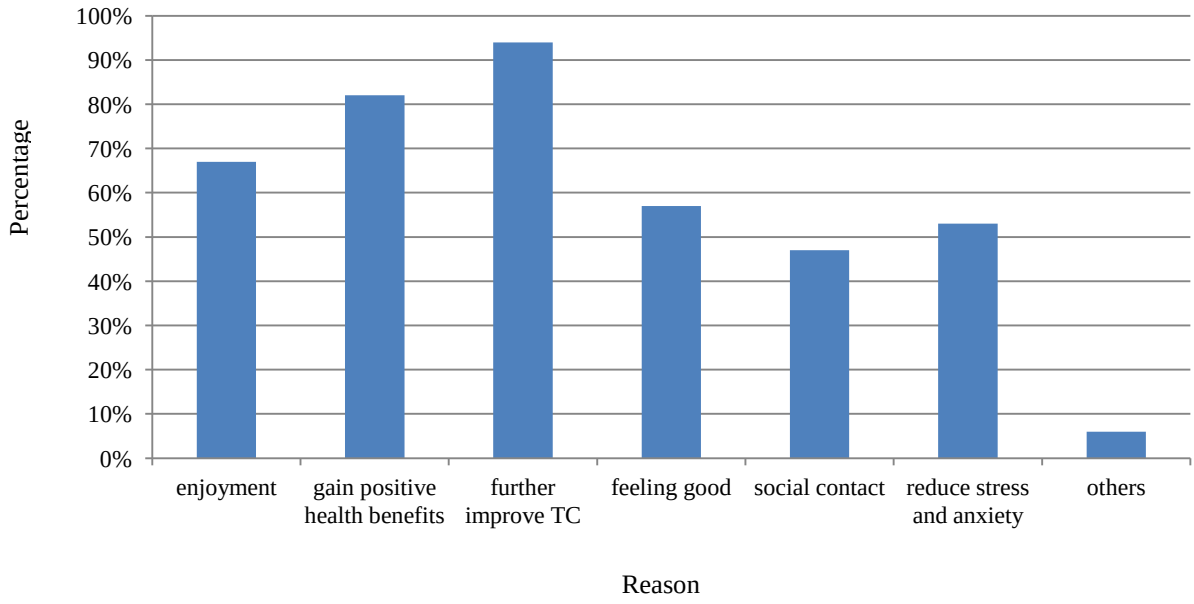

Figure 5.1. Reasons for continuing Tai Chi practice (N = 325).

However, forty-eight respondents had given up TC, predominantly due to a lack of time (n = 24) and the impact of illness (n = 15), as shown in Figure 5.2. Twenty percent of those who had given up did so because they felt TC was too difficult to learn.

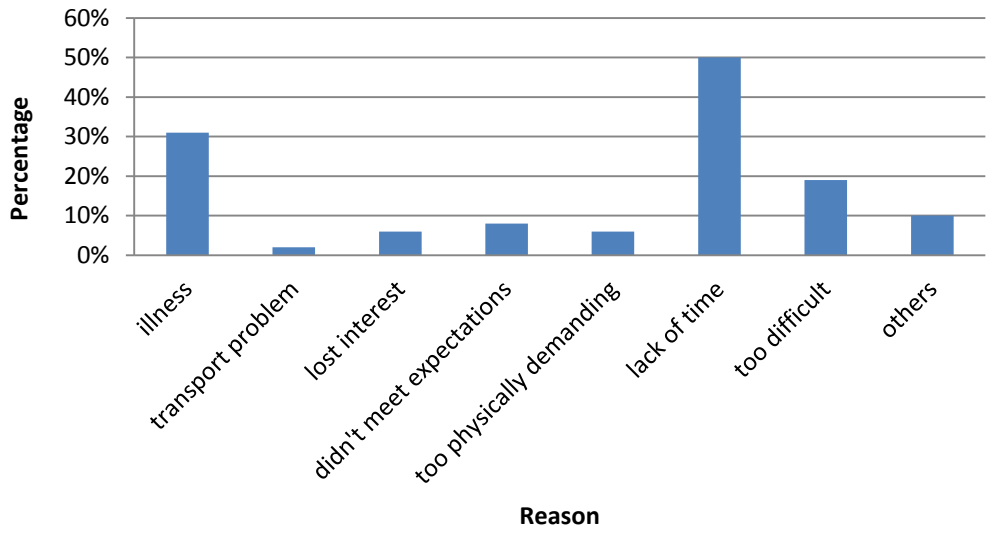

Figure 5.2. Reasons for giving up Tai Chi practice (N = 48).

5.2.3 Information source prompting first contact with Tai Chi

Friends or family members were the main information source (46%, n = 174) for the respondents to initially hear about TC, as shown in Figure 5.3, followed by advertising (39%, n = 149). In the advertising category, there were five main sources, community newspaper, the Internet, flyer, radio and TV, with most respondents stating they received their information from the community newspaper, as displayed in Figure 5.4. Only six per cent (n = 22) reported TC was recommended by a health professional, with doctors being the most frequent information source (32% from medical specialists and 27% from GPs) whilst nurses only contributed a small proportion (9%) of those in the medical group who recommended TC (see Figure 5.5).

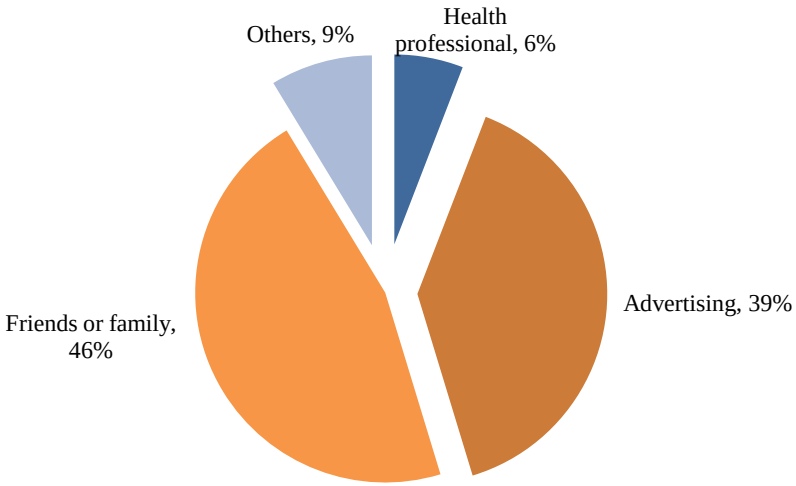

Figure 5.3. Source of first contact with Tai Chi (N = 378).

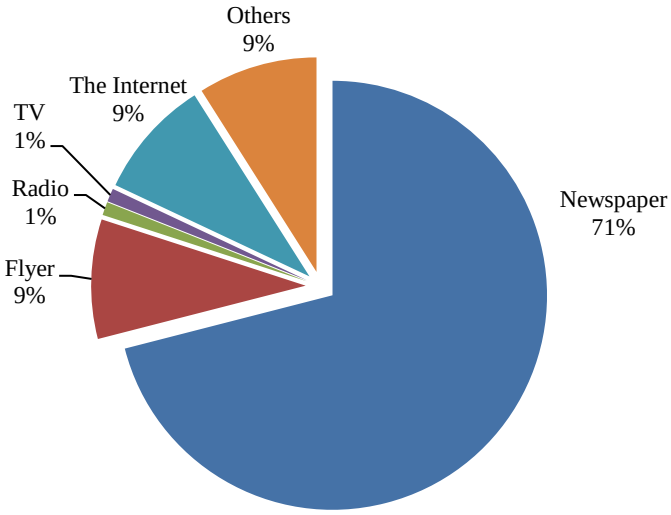

Figure 5.4. Types of advertising (N = 149).

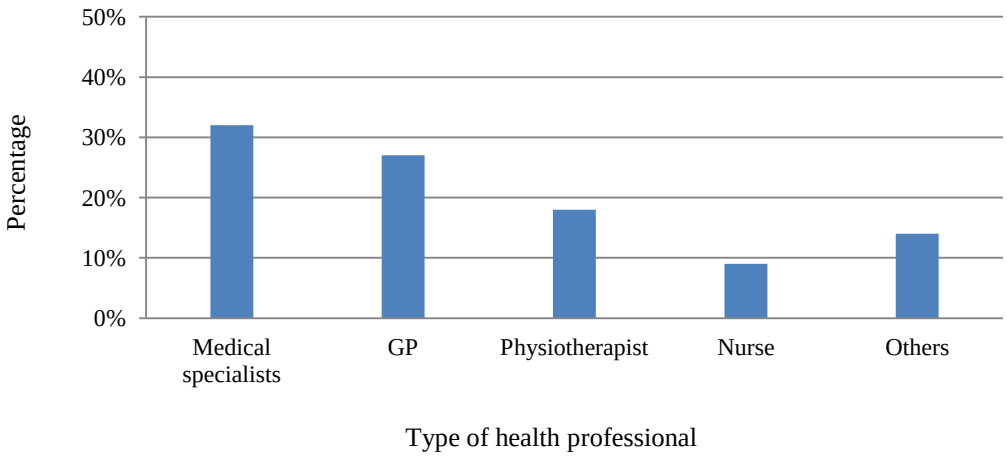

Figure 5.5. Percentage of respondents receiving recommendations from health professionals (N = 22).

5.2.4 Health background

The health status of participants was considered an important factor by the researcher in the investigation of the effects of TC on health and understanding of the potential motivations in seeking TC as a form of physical activity. Therefore, information was collected from respondents on self-reported health status prior to and after TC practice along with Body Mass Index (BMI) and their medical history.

Health Status

Self-assessed health is often considered as an indicator of individual health status (Australian Institute of Health and Welfare [AIHW], 2008a). Participants were asked to rate their overall health prior to, and after TC practice, using a six-point scale, from very poor through to excellent. Overall, participants rated their health status as higher after commencing TC practice (Mean (*M)* = 4.57, standard deviations (*SD*) = 0.85) than prior to TC practice (*M* = 3.99, *SD* =1.00). Specifically, both men (33%) and women (29%) rated their health status as excellent or very good before TC

commencement but it rose to 54% and 59% respectively after TC practice, as shown in Table 5.4. Using a paired samples t test, the participants rated, on average, 0.59 of a Likert point (95% Confidence Interval (CI) 0.68 to 0.49) higher on the self-assessed health scale after TC practice than before commencing it. This difference was statistically significant, t (375) =12.66, $p < .001$ (2-tailed). The calculated effect size (d = 0.63) indicated a medium to large effect of TC practice on health status. The assumption of normality and normality of difference scores were confirmed through examination of the distribution histograms.

Table 5.4

Self-assessed Health Status (percent)

Health status	Males (N = 83)		Females(N = 298)		Combined genders (N = 381)	
	Prior to[a]	After[b]	Prior to[a]	After[b]	Prior to[a]	After[b]
Excellent/very good	33.0	54.2	29.4	58.7	30	57.5
Good	36.6	33.7	41.2	33.1	40.4	33.4
Fair / poor /very poor	30.5	12	29.4	8.2	29.5	9.0

[a] Health status prior to TC practice.
[b] Health status after TC practice.

Body Mass Index

Body Mass Index (BMI) is a measure of body fat and was calculated from respondent's self-reported height and weight. According to the formula of weight in kilograms (kg) divided by height in meters squared (m^2), each respondent's BMI was calculated and then classified into four categories according to the World Health Organization (WHO) BMI classification (World Health Organization, n.d.): underweight (BMI = 18.50 or less), normal weight (BMI = 18.50-24.99), overweight

(BMI ⩾ 25.00) or obese (BMI ⩾ 30.00). The results showed that half of the respondents (51%, n = 189) were within normal BMI range with one third (n = 119) being in the overweight category and 15% (n = 54) classified in the obese category. Six respondents (2%, n = 6) of the total sample were in the underweight category.

Chronic illnesses history

There was a high prevalence of chronic illness in this sample. Seventy-seven percent of participants (n = 293) reported they had been diagnosed with a variety of chronic health conditions. Diagnosed medical conditions reported by the respondents were categorized using common chronic conditions, such as cardiovascular diseases (CVDs), musculoskeletal disorders (MSDs) and cancers as shown in Table 5.5. Arthritis and hypertension were categorized separately from musculoskeletal and cardio-vascular diseases to capture the specific number of participants suffering with those conditions. Overall, the CVD (43%) and MSD (45%) chronic illness categories were the two most commonly reported by participants, while arthritis (31%) was the most common single disease in the sample population, followed by hypertension (28%) and psychological conditions (24%). In addition, 5% of the participants (n = 18) had at one time experienced a fall.

Table 5.5

Frequency of Chronic Conditions Reported by Respondents (N =382)

Chronic condition	Percentage of sample	Rank
CVD		
Hypertension	28% (n=105)	2
Cardiovascular conditions	15% (n=57)	4
MSDs		
Arthritis	31% (n=119)	1
Other musculoskeletal disorders	14% (n=54)	5
Diabetic	5% (n=18)	8
Asthma	11% (n=41)	7
Lung disease	2% (n= 7)	9
Psychological problems	24% (n=93)	3
Cancer	11% (n=43)	6
Other	14% (n=55)	

The reported prevalence of CVD, MSDs, cancers and psychological conditions were further classified, as illustrated in Table 5.6. Notably, there was a high prevalence of breast cancer (37%) in the cancer category, spinal problems (28%) in MSDs and cardiac arrhythmia (29%) in CVD. Of those with psychological conditions, nearly one third reported suffering from anxiety, depression or both.

Table 5.6
Frequency of Specific Medical Conditions within the CVDs, MSDs, Cancer and Psychological Categories

Conditions in each chronic disease category	Percentage
Cardiovascular conditions (*N* = 57)	
Cardiac arrhythmia	29%
Heart attack	18%
Cardiac valvular disease	14%
Hypercholesterolemia	14%
Cardiac V/A disease	8%
Other	18%
Other musculoskeletal disorders (*N* = 54)	
Spinal problems	28%
Back pain	11%
Osteoporosis	11%
Fibromyalgia	7%
Joint disorder	7%
More than two conditions	22%
Other	13%
Psychological conditions (*N* = 93)	
Anxiety	28%
Depression	35%
Anxiety & depression	30%
Other	6%
Cancer (*N* = 43)	
Breast cancer	37%
Skin cancer	19%
Prostate cancer	9%
Intestinal cancer	9%
Uterine cancer	7%
Other	19%

Moreover, the phenomenon of suffering more than one chronic condition prevailed among the sample population, in which the number of health conditions suffered by respondents ranged from zero to six (see Figure 5.6). More than half the sample (55%, n = 210) was suffering at least one or two chronic medical conditions with a small proportion (4%, n = 16) reporting more than five health problems. The number of chronic conditions reported by participants was related to health self-assessment before TC commencement. Using a bivariate Peason's correlation coefficient test, it was found that the greater the number of chronic conditions reported, the lower respondents were likely to rate their health status, r (377) = .348, p = .000, r^2 = .12. Prior to analysis, the assumptions of normality and linearity were assessed by the normal Q-Q and scatterplot. Both visual inspections showed satisfactory results.

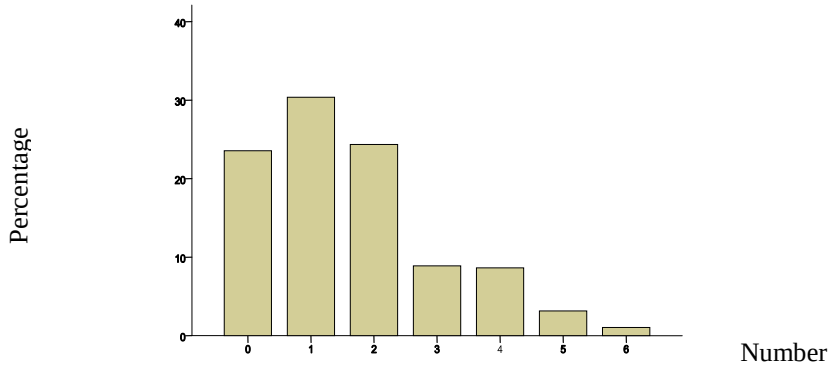

Figure 5.6. Percentage of the number of chronic conditions (N = 382)

5.2.5 Relationships between Health Locus of Control and demographic and health factors

Health beliefs of participants were assessed using the Multidimensional Health Locus of Control (MHLC) scales and independent sample *t* test was performed to compare the differences in the MHLC scores in relation to age, gender and the presence or absence of health conditions.

A total of 362 participants completed the MHLC scales, with 20 participants completing the wrong scale, that is these respondents had identified themselves as suffering at least one chronic illness but completed the Form A instead of Form C, and vice versa. Where the wrong scales were completed these data were removed from all analyses to ensure reliability and accuracy of the findings. There were 241 valid responses to Form C (for those with chronic illness) and 99 to Form A (those without chronic illness). Overall, participants scored higher in the Internal Health Locus of Control (IHLC) scale than both the Powerful Others Health Locus of Control (PHLC) and the Chance Health Locus of Control (CHLC) scales of the MHLC, as shown in Table 5.7.

Table 5.7
Comparison of the MHLC Scores from Tai Chi Practitioners with and without Chronic Illness

Chronic conditions	n	IHLC Mean (SD)	CHLC Mean (SD)	PHLC Mean (SD)
No	99	27.49 (4.48)**	14.92 (5.44)	14.06 (5.12)**
Yes	241	23.77 (7.14)**	13.57 (6.21)	19.70 (5.44)**

* $p < .05$. ** $p < .01$.

Prior to conducting a *t* test, the internal consistency of the scale was assessed. The Cronbach's alpha for the 18-item MHLC scales was .69 in Form C and .62 in Form A, respectively. Further examination of internal consistency in each sub-scale of the MHLC scale revealed, a Cronbach's alpha coefficient of 0.86 for the IHLC scale, 0.83 for the CHLC scale and 0.68 for the PHLC scale in Form C, whilst the Cronbach's alpha levels were .76, .72, and .69 for the IHLC, PHLC and CHLC scales respectively in Form A.

After visually inspecting the normal Q-Q plots, which showed an approximately normal distribution, Pearson correlation was used to assess the linear relationship between any two subscales and the results are presented in Table 5.8. Generally, there was a weak, negative correlation between IHLC and CHLC and a weak-to-moderate positive association between PHLC and CHLC in both Form A and C. The negative relationship between IHLC and PHLC was statistically significant for those without chronic illness, whereas there was no significant association in those participants who suffered with one or more chronic illnesses.

Table 5.8
Bivariate Correlation between the MHLC Subscales

Form	IHLC and PHLC				IHLC and CHLC				PHLC and CHLC			
	r	N	Sig.	r 2	r	N	Sig.	r 2	r	N	Sig.	r 2
Form A	-.261**	99	.009	.068	-.243*	99	.015	.059	.377**	99	.000	.142
Form C	-.023	241	.728	-	-.200**	241	.002	.040	.207**	241	.001	.043

*Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

When the MHLC scores were examined in accordance to the presence or not of chronic conditions, as shown in Table 5.9, the *t* test was statistically significant for each subscale. Specifically, people diagnosed with a chronic illness (*M* = 18.17, *SD* = 7.42) reported significantly higher scores in the PHLC scale than those without chronic conditions (*M* = 13.78, *SD* = 5.44), *t* (247) = 6.18, *p* = .00, two-tailed, *d* = .63. However, they were lower in IHLC. People with chronic conditions rated some 5.4 lower in IHLC (95% CI: - 6.66 - 3.42), *t* (286) = -6.133, *p* = .00, two-tailed, *d* = .51, and 2.18 lower in CHLC (95% CI: - 3.69 - .68), *t* (359) = -2.83, *p* =.005, *d* = .33.

The associations between health beliefs measured in the MHLC scales and demographics were also examined using 2-tailed independent samples *t* tests as data were normally distributed. The demographic factors examined included age and gender, in addition to the sub groups of those specifically with and without psychological conditions. The results are shown on Table 5.9.

Table 5.9
Characteristics of the MHLC scales in Taoist Tai Chi™ Practitioners in WA (N=362)

Variables	N	IHLC	CHLC	PHLC
		Mean (SD)	Mean (SD)	Mean (SD)
Age				
>=55	268	22.73(9.12) **	13.13(7.10)	17.22(7.41)
<55	91	25.31(7.17) **	12.89(4.90)	16.21(6.19)
Gender				
Male	78	25.08(8.79) *	13.76(7.01)	16.79(7.16)
Female	282	22.83(8.76) *	12.84(6.53)	16.95(7.19)
Psychological condition				
Yes	82	22.54(7.70)	13.20(6.31)	18.27(6.59)
No	279	23.55(9.09)	13.01(6.74)	16.56(7.26)

* $p < .05$. ** $p < .01$.

Those aged under 55 years (t (196) = 2.75, $p < .01$, 95% CI: 0.73-4.42, $d = .29$) and men (t (358) = 2.00, $p < .05$, 95% CI: 0.37- 4.45, $d = .26$) scored significantly higher in the IHLC scales, indicating that male participants and participants under 55 were more likely to believe they were personally responsible for their own health status. Both effect sizes were considered small. However, no statistical difference was found for the PHLC and CHLC scales in regard to either age or gender. Noticeably, there were no significant differences across any of the subscales between participants with or without psychological conditions.

5.3 Patterns of Use of Taoist Tai Chi™ in Western Australia

In this section, findings regarding three specific elements are presented:

- patterns of participation in TC;
- frequency and reasons for repeating beginners' classes; and
- Other forms of Taoist Tai Chi™ Arts.

5.3.1 Patterns of participation in Taoist Tai Chi™

A pattern is "a reliable sample of traits, acts, tendencies, or other observable characteristics of a person, group, or institution" (Merriam Webster Dictionary [MWD]. n.d.). In this study, it refers specifically to the behaviours of TTC members in relation to their practice of TC. This involves the level of complexity, frequency, duration, and length of practice undertaken in addition to the location where it was practised and type of companionship. Data presented in Table 5.10 provides an overview of the patterns of participation in TTC in WA for 2010.

Three quarters of the respondents (n = 269) commenced their TC practice within the last ten years, with only a small percentage (7%, n = 25) having commenced more than 20 years ago. The average time period of TC practice for study participants was 6.4 years. The most popular pattern of TC practice was to attend TC sessions in the club twice per week for a period of 60 to 90 minutes per class with other TTC group members. Morning was the time most preferred for practising TC. More than half of the respondents practised TC once or twice per week and spent a total amount of between two and five hours on TC practice. After the first beginners' course, most respondents (86%) continued TC practice but 48 respondents had given up for various reasons that have been presented earlier in the section.

One-way between groups ANOVA was performed to test the impact of age on TC session attendance and time spent in the TC session. As only one participant was in the age group under 25 and the number was not enough to run post hoc analysis, the age group was excluded from the ANOVA. The assumptions of normality and homogeneity were confirmed and the result revealed that there were no significant differences between age groups. However, age significantly affected the duration over which TC participants practiced ($F (3, 350) = 4.35$, $p = .005$, $\eta^2 = .036$ - a small size effect). Normally, a TC session lasted 90 minutes, including a 15-minute break. Post hoc analyses with Tukey's HSD ($\alpha = .05$) showed that people aged over 75 ($M = 4.21$, $SD = .80$) attended TC classes longer than those aged between 45 and 59 ($M = 3.84$, $SD = .68$). However, there was no significant difference between other age groups.

Table 5.10
Patterns of Use of Taoist Tai Chi™ in WA (%) (N = 382)

Pattern	Frequency	Percent (%)
Period of time since first commencing TC (yrs)	1-5	54 (n= 195)
	6-10	20 (n=74)
	11-15	11 (n= 40)
	16-20	8 (n= 29)
	>20	7 (n= 25)
Frequency of practicing TC	Every day	5 (n= 19)
	>3 times/wk	17 (n= 61)
	3times/wk	17 (n= 61)
	2/wk	38 (n= 137)
	1 /wk	22 (n= 79)
	1/month or less	1 (n= 2)
Attendance at branch TC sessions/week	Once	28 (n= 102)
	Twice	46 (n= 167)
	Three	19 (n= 69)
	> Three	6 (n= 23)
Total amount of time spent practicing/week	< 1 hr	7 (n= 25)
	1-2 hrs	26 (n= 92)
	2-5 hrs	52 (n= 185)
	>5 hrs	15 (n= 53)
Time of day of TC practice	Morning	40 (n= 143)
	Afternoon	7 (n= 24)
	Evening	22 (n= 78)
	Time often varies	32 (n= 116)
Type of TC companions	TC members	82 (n= 295)
	By myself	13 (n= 45)
	TC members & by myself	4 (n= 16)
	With friends	1 (n= 4)
Location of TC practice	At the club	82 (n= 295)
	At home	9 (n= 34)
	Club & home	5 (n= 19)
	Others	4 (n= 14)
Type of TC practice after completion of first beginner's course	Commenced continuing classes	86 (n = 325)
	Gave up	9 (n = 35)
	Still in their first classes	5 (n = 18)

TC was practised both inside and outside the TC clubs, but the duration of practice was considerably different. In the sample population, 75% of respondents (n = 269) practiced TC outside of the club, but most (90%) only spent less than 30 minutes practising on any one occasion, whilst the majority of TTC members (82%, n = 293) spend 60 minutes or more practising when they attended TTC club sessions (see Figure 5.7). The relationship between TC practice outside of the TC club and self-health assessment was examined using a Pearson's correlation coefficient. The results revealed a positive and significant correlation, r (263) = .169, p = .006, two-tailed, but the effect size (r^2 =. 029) was too small to be able to predict health improvement.

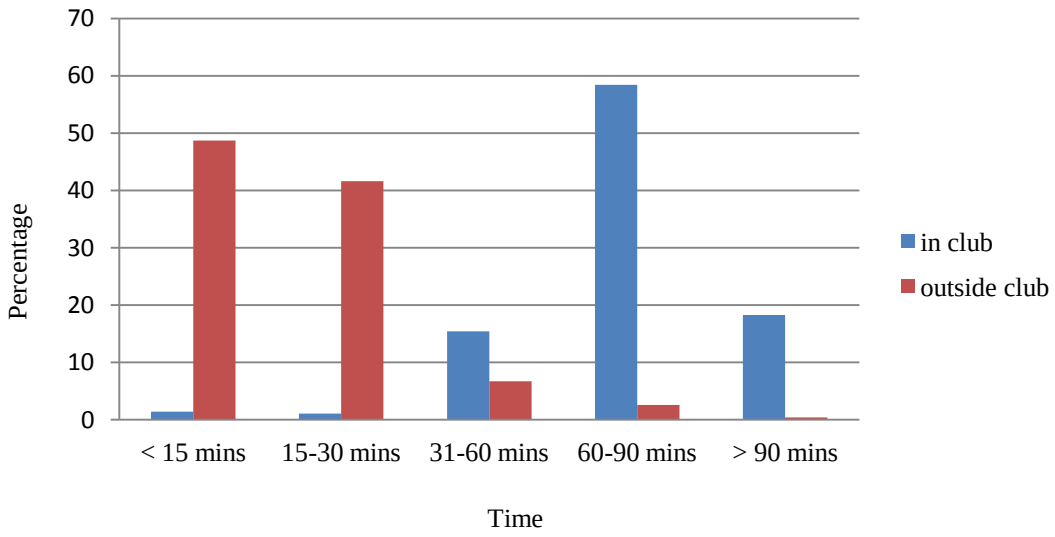

Figure 5.7. Amount of time spent practicing either in (N = 357) or outside (N = 269) the Tai Chi club

In addition, a Mann-Whitney *U* test was used to compare the frequency of TC practice amongst the chronic condition group to that of the group without chronic conditions as the data were not normally distributed for the chronic conditions group. This result indicated that the frequency of TC practise in people with chronic conditions

(Mean Rank = 188.23, n = 275) was significantly higher than those without chronic conditions (Mean Rank = 153.06, n = 84), $U = 9287.00$, $z = -.2.83$ (corrected for ties), $p = .005$, two-tailed, $r = 0.15$. The r indicates a small effect size.

5.3.2 Frequency and reasons for repeating Beginners' classes

Attending Beginner's classes is the first step in learning the whole 108-movement set in TTC. During this period, TC instructors give details and demonstration of each TC movement on a step-by-step basis. Once the initial beginners' course has been completed, usually within three months, the participants have had the opportunity to practise all 108 movements of TTC, which are referred to as "the set". Participants are then encouraged to attend one of the "Continuing classes" on offer where practitioners begin to learn and refine their ability to practise "the set" in addition to practising exercises designed to build their physical strength and agility. However, some people do not enrol in "continuing classes", instead they choose to repeat the Beginner's classes.

Over half the participants (58%, n = 219) attended Beginner's classes only once, while nearly one in three (33%, n = 123) repeated it more than twice for personal reasons with 9% (n = 34) repeating so they could help others. The impact of age on repetition of the Beginner's classes was investigated using a one-way between groups ANOVA. As the age group under 25 only included one participant and was not suitable for Post hoc analysis, this group was excluded from this analysis. The assumption of normality was upheld.

The ANOVA was statistically significant, F (3, 369) = 3.84, p = .01, η^2 = .03. Further investigation was performed using Post hoc analysis, showing that older participants aged between 60 and 74 (M = 1.91, SD = 1.37) had significantly higher levels of repetition than those aged between 25 and 44 (M = 1.19, SD =. 48). However, there was no significant difference between other any two groups. Also an independent t test showed neither gender (t (373) = 1.44, p = .15) nor chronic conditions (t (374) = 0.15, p = .88) were related to the number of members repeating the Beginner's classes.

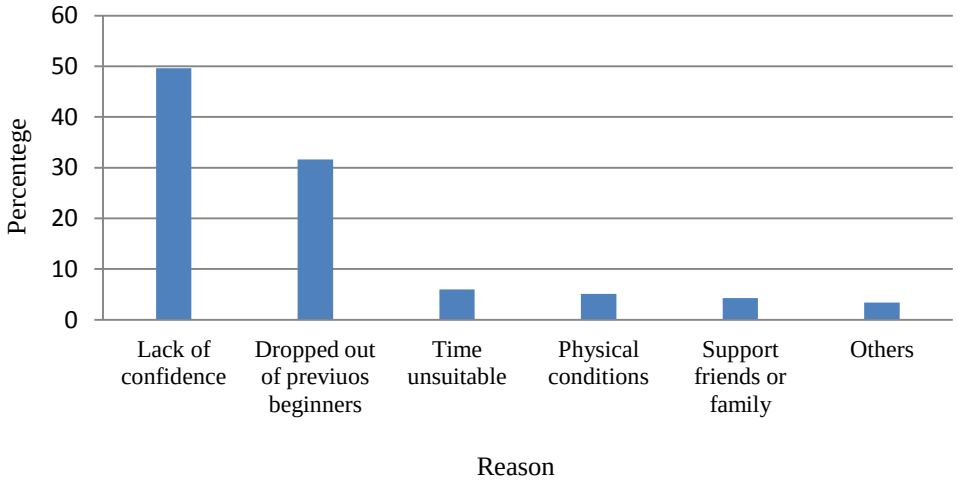

Figure 5.8. Personal reasons for repeating beginner's course (N = 123)

Figure 5.8 above shows the reasons for attending a Beginner's course more than once. Approximately half of the study participants who repeated Beginner's classes (n = 58) did so due to lack of confidence in remembering the set and a belief they needed to repeat in order to improve their TC before going onto a continuing class, and nearly a third repeated because they dropped TC some time ago and needed to pick up again before going back to continuing class.

5.3.3 Other forms of Taoist Tai Chi™ Arts

Within the TTCS there are other programs or "arts" associated with TC that are available for members to learn and practice. These include:

- a health recovery program;
- meditation;
- chanting;
- sword set;
- sabre; and
- Lok Hup.

In addition to the 108 move TC set, some participants (22%) participated in both meditation (although only 3% did so frequently) and Lok Hup, 14% in chanting, 8% in sabre and 8% in the health recovery program, all at varying levels of participation (see Table 5.11).

Table 5.11
Frequency of Participation in Other Forms of Tai Chi™ Arts (%)

TC arts of health	Never	Rarely	Occasionally	Regularly	Frequently
Meditation	78.1 (n = 268)	7.3 (n = 25)	8.5 (n =2 9)	3.5 (n = 12)	2.6 (n = 9)
Chanting	86.2 (n = 293)	9.7 (n = 33)	2.6 (n = 9)	0.9 (n = 3)	0.6 (n = 2)
Health recovery program	92 (n = 310)	2.1 (n = 7)	3.0 (n = 10)	2.4 (n = 8)	0.6 (n = 2)
Sword	92.5 (n = 312)	3.0 (n = 10)	2.7 (n = 9)	1.8 (n = 6)	0 (n = 0)
Sabre	92.6 (n = 311)	1.8 (n = 6)	2.7 (n = 9)	2.7 (n = 9)	0.3 (n = 1)
Lokhup	78.9 (n = 269)	2.6 (n = 9)	8.5 (n = 29)	6.7 (n = 23)	3.2 (n = 11)

Amongst the respondents with anxiety and/or depression, more than one third of those with anxiety and nearly one in two with depression practiced meditation, as shown in Table 5.12. A Mann-Whitney *U* test revealed that the frequency of meditation practice in participants with psychological conditions (*Mean Rank* = 186.18, *n* = 77) was slightly higher than those without (*Mean Rank* = 167.90, *n* = 266), *U* = 9149.50, *z* = -1.97 (corrected for ties), *p* = .049 (two-tailed), although the effect was considered as small (*r* = .11). The presence or absence of physical medical conditions (*U* = 7295.50, *z* = -.49 (corrected for ties), *p* = .62) showed no significant effect on the practice of other TC arts.

Table 5.12
Frequency of Anxiety and Depression in Participants Practising Meditation

Psychological conditions	Never	Rarely	Occasionally	Regularly	Frequently
Anxiety	61.2(n = 30)	2.0(n = 1)	20.4(n = 10)	10.2 (n = 5)	6.1(n = 3)
Depression	82.0(n = 41)	4.0(n = 2)	6.0 (n = 3)	4.0 (n = 2)	4.0(n = 2)

5.4 Participation in Social Activities within the Taoist Tai Chi™ Society

Social support is considered an essential part of the TTC values. In addition to TC and other related TC arts, the Society also offers a wide range of social activities and volunteer positions as a platform for TC members to exchange and share their experiences.

National and international workshops are conducted at various locations every year and, apart from their training function in TC, also provide an opportunity to

socialise. Although a majority of respondents reported they had never attended these workshops, about 30% had stated they attended national or/and international workshops yearly or every second year (see Table 5.13). The attendance was associated slightly with employment status, household income and the presence or absence of chronic conditions, but not related to age, revealed by using Bivariate Pearson correlation, as illustrated in Table 5.14. Employed participants and those without chronic conditions were significantly more likely to be involved in both international and national workshops, with an effect size ranging from small to large. In addition, income was also significantly associated with their workshop attendance.

Table 5.13
Percentage of Participants Attending Tai Chi Workshops

workshop	Never	Every second year	Every year
National workshops	61.7 (n = 213)	18.3(n = 63)	20.0(n = 69)
International workshops	71.9 (n = 246)	12.6(n = 43)	15.5(n = 53)

Table 5.14
Comparison of Workshop Attendance to Age, Income, Employment and Chronic conditions

	National workshops			International workshops		
	df	*r*	r^2	*df*	*r*	r^2
Age	342	-.06	-	337	-.07	-
Income	343	.15**	.02	323	.22*	.05
Employment	341	-.13*	.02	337	-.18*	.03
Chronic conditions	343	.20**	.04	339	.17*	.03

* $p < .05$. ** $p < .01$

A majority of respondents (78%, n = 276) reported they had attended other social functions held by the TTCS, including 8% (n = 28) attending frequently, 19% (n = 66) either regularly or rarely, 32% (n = 115) occasionally, with 22% (n = 78) not attending any social events. Using a one-way between groups ANOVA, retirees (*M* = 2.98, *SD = 1.11*) showed the highest rate of participation in social functions compared to those who were working full-time (*M* = 2.43, *SD* = 1.23), *F (5, 346)* = 3.98, *p* = .00 (two-tailed). This effect (η^2 = .054) could be described as approaching medium.

Members' volunteering is essential to the successful running of the Society as the TTCS is characterized as a non-profit, charitable organization both internationally and nationally, although there is one full-time and one part-time paid position as part of the western region. Consequently, volunteer positions are available across a wide range of responsibilities including committee members, instructors and their assistants, known as "corner persons", administration, housekeeping, maintenance and fundraising. Members choose their own types of preferred participation in volunteer activities although the reasons for their choices have not been investigated.

Although 32 per cent of the members did not volunteer for any club positions, most members (68%, n = 257) took on one or more volunteer jobs. These volunteers were retired with an average age of 63, female, and well-educated, as shown in Table 5.15. Housekeeping (39%) was the most popular volunteer job, followed by fundraising (23%) and workshop assistant (22%), as displayed in Figure 5.9. In addition, one in five (21%) had taken a job as a committee member at some time. The least popular volunteering position was organizing social events (9%). The largest proportion under "other" was the members volunteering to be a "corner person" and they comprised 13%

of this section. “Corner persons” are normally senior TC practitioners or those who are familiar with the whole set of TC moves. They stand at the front corners in TC sessions and assist new TC practitioners by modelling TC movements during practice.

Table 5.15
Characteristic of Volunteers in the Taoist Tai Chi™ Society in WA (N = 257)

Variable		Percentage
Age		63(Mean)
Gender		
	Male	20% (n = 51)
	Female	80% (n = 205)
Chronic conditions		
	Yes	74% (n = 191)
	No	26% (n = 66)
Education		
	University qualification or over	51% (n = 131)
	Year 12 or TAFE	20% (n = 52)
	Less than Year 12	29% (n = 73)
Employment		
	Retired	51% (n = 129)
	Full-time	24% (n = 24)
	Part-time or casual	22% (n = 58)
Marital status		
	Married or living with a partner	65% (n = 167)
	Single	7% (n = 19)
	Widowed	13%(n = 33)
	Divorced	11%(n = 29)
	Separated	3% (n = 8)

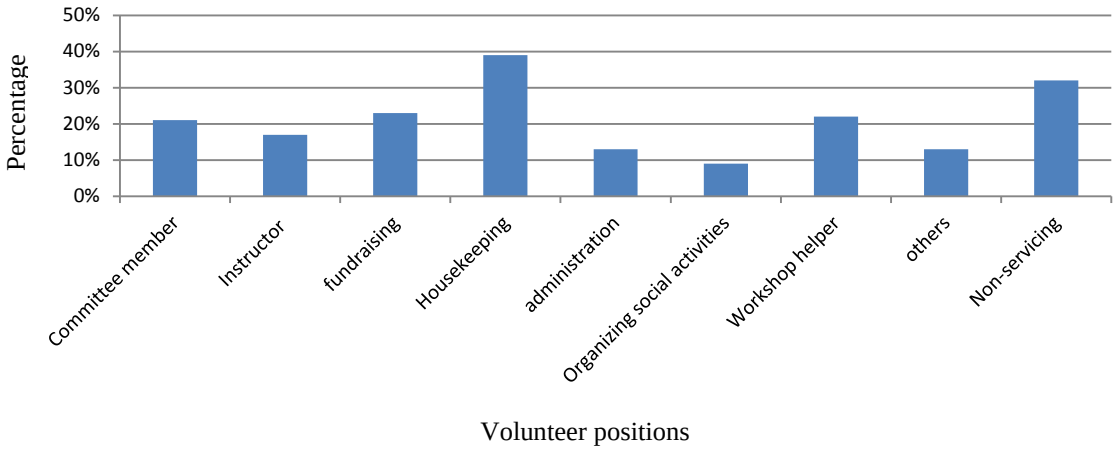

Figure 5.9. Percentage of participants volunteering for positions in the Taoist Tai Chi™ Society (N = 257)

5.5 Predicting Patterns of Taoist Tai Chi™ Practice

Multiple regression was used to investigate whether health beliefs were a predictor for patterns of TTC participation, which would assist with understanding the impact of individual health beliefs on the practice of TC. A multiple regression was performed using the scores from the MHLC scales to predict the overall frequency of TC practice, the attendance at TTC club sessions per week and the years of TC practice since first commencing. Logistic regression was used to predict whether participants practised TC outside of the formal club sessions and whether they attended continuing classes after their initial Beginner's classes were completed. In each regression model, the sum of each of the MHLC subscales was the predictor variables and the patterns of TC practice were the outcome variables.

Prior to interpreting the findings from the regression analysis, several statistical assumptions were examined. As the results of the assumptions in each regression model were similar, they were reported together. Firstly, the ratio of cases to independent

variables was calculated. In accordance with the formula described in the methodological chapter, a minimum sample size of 74 was required to produce a reliable regression model, and 107 for testing individual predictors when three independent variables were considered. As 241 participants responded to Form C, this ensured a larger sample than the minimum number required. In regard to Form A, the number of responses (n = 99) was suitable to undertake the regression analysis but fell short of the number required for the interpretation of individual predictors. However, as there were no statistically significant predictors identified in the analysis of Form A, this proved of no concern.

Secondly, Maximum Mahalanobis Distance in each regression model was in the range of the critical chi-square value ($x^2 = 16.266$) for $df = 3$ at $\alpha = .001$) and standardized residuals were located in a range of ± 3.0 at p value of .001, so there were no concerns related to outliers in either the multivariate variables or regression solutions. Although there were some univariate outliers in variables identified, after close examination, the researcher was confident that it was real data given by respondents rather than an error and these cases were, therefore, not eliminated from the regression analysis.

Thirdly, high tolerances ranging from .959 to .815 and lower Variance Inflation Factor (VIF) statistics of approximately 2 in each regression model revealed that the assumption of multicollinearity would not influence the final interpretation of regression analysis. Furthermore, the visual inspection of the normal P-P plot graph of regression standardized residuals illustrated that the assumptions of normality, linearity and homoscedasticity of residuals were met. Figure 5.10 and Figure 5.11 show the

associated graphs with frequency as the outcome variable. Finally a value for the Durbin-Waston test of between 2 and 3 showed that no two observational residuals were uncorrelated. Overall, the assumptions were satisfied in regard to the multiple regression analysis, ensuring confidence in interpreting the outcome.

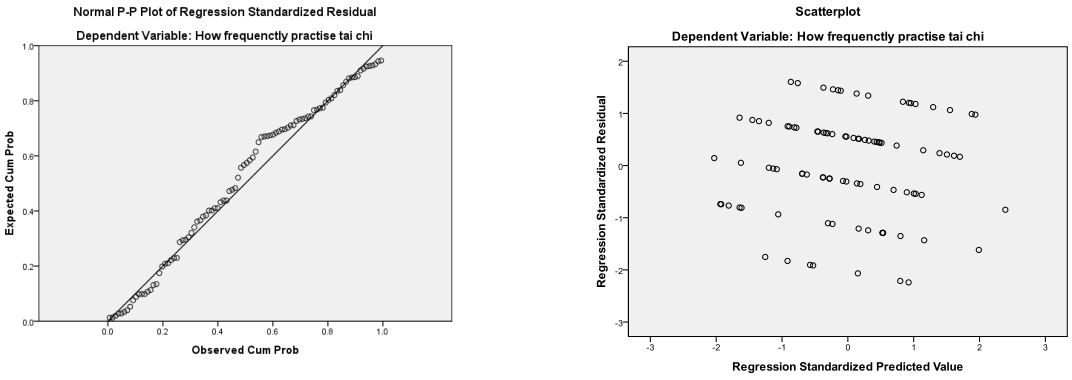

Figure 5.10. Normal P-P Plot and scatterplot in relation to Form C of the MHLC scales

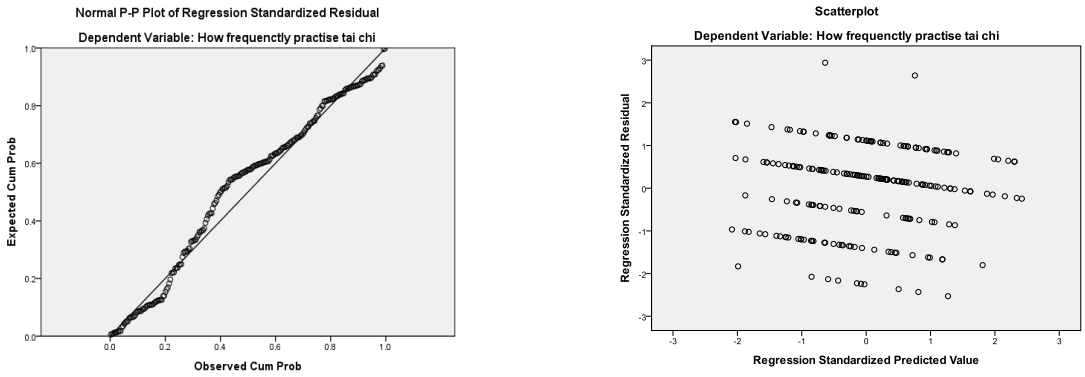

Figure 5.11. Normal P-P Plot and Scatterplot in relation to Form A of the MHLC scales

The results of the standard regression analysis are reported using *R* square, adjusted *R* square, significance values, unstandardised (B), standardised (β) regression coefficients and squared semi-partial correlations (sr^2) for each predictor. Table 5.16 summarizes the results from the IHLC, PHLC and CHLC scales in the regression model according to the patterns of TC practice.

Table 5.16
Multiple Regression Results of HLC Beliefs on Predicting the Frequency, Attendance and Duration of Tai Chi Practice (N = 350)

TC-related behaviours	Variables	R^2	Adjusted R^2	B	β	sr^2
Frequency of TC practice						
without chronic illness		.049	.018			
	IHLC			.037	.141	.018
	CHLC			-.015	-.070	.004
	PHLC			-.020	-.091	.007
with chronic illness		.044*	.032			
	IHLC			.032**	.194	.036
	CHLC			-.008	-.043	.002
	PHLC			-.006	-.028	.001
Attendance of TC class						
without chronic illness		.013	-.020			
	IHLC			.006	.029	.001
	CHLC			-.001	-.004	.005
	PHLC			-.017	-.099	.000
with chronic illness		.037*	.024			
	IHLC			.021**	.188	.034
	CHLC			.010	.072	.004
	PHLC			.005	.036	.001
Duration of TC practice						
without chronic illness						
	IHLC	.006	-.027	.019	.067	.004
	CHLC			-.003	-.013	.000
	PHLC			.011	.048	.002
with chronic illness		.004	-.009			
	IHLC			.007	.036	.001
	CHLC			.012	.058	.003
	PHLC			-.006	-.024	.001

* $p < .05$. ** $p < .01$

5.5.1 General frequency of Tai Chi practice

The combination of the IHLC, PHLC and CHLC beliefs contributed to 4.4% of the variance in how frequently people with chronic conditions practiced TC, R^2 =.044, adjusted R^2 = .032, F (3, 223) = 3.459, $p < .05$, although the effect size (f^2 = .05) was considered small. Amongst the three components, IHLC was the only significant single predictor ($p < .01$) to the frequency of TC practice.

5.5.2 Frequency of attendance at Tai Chi classes

In people with chronic conditions, the MHLC scales accounted for a significant 3.7% of the variance in the frequency of attendance at TC classes in any one week, R^2 =.037, adjusted R^2 = .024, F (3, 223) = 2.850, $p < .05$, in which IHLC was again the only statistically significant predictor, $p < .01$, uniquely accounting for 3.4% of the variance of attendance. A combined effect of .04 was calculated. Again, the scales were not predictive amongst people without chronic illness in regard to how many times people attended TC classes weekly.

5.5.3 Duration of Tai Chi practice

None of the MHLC subscale scores were predictive of the number of years of practise since first starting TC, R^2 =.006, adjusted R^2 = -.027, F (3, 92) = .173, p = .915 in healthy adults and R^2 =.004, adjusted R^2 = -.009, F (3, 227) = .286, p = .836 in those living with chronic illness.

5.5.4 Location and continuance of Tai Chi practice

Logistic multiple regression was performed to predict whether respondents continued Taoist TC after completing their Beginner's classes and whether they practiced TC outside of organized club sessions. According to Field's recommendations (2009), the results are reported with beta values (B), standard errors (SE), odds ratio and 95%CI, as well as significance values. Both regression models in the logical regression analysis were suitable for use due to the reduced values of -2 log-likelihood (-2LL).

Internal Health Locus of control was a single strong predictor for people with chronic conditions who, in addition to attending club TC sessions, also practised TC outside of the club. The internal HLC accounted for 6.4% of the variability, $p < .01$, with an odds ratio of 1.067 (95% CI: 1.067-1.114), as shown in Table 5.17.

Table 5.17

Logistic Regression Analysis Results of the MHLC Scales on Predicting Whether Participants Practiced Tai Chi outside of Organized club sessions and Continued Tai Chi after Completing the Beginner's classes (N = 350)

				95% CI for ODDs Ratio		
		B	SE	Lower	Odds ratio	Upper
Practise TC outside						
without chronic illness (n = 93)	Constant	-.744	1.881			
	IHLC	.091	.055	.984	1.096	1.220
	CHLC	.025	.048	.933	1.025	1.126
	PHLC	-.079	.051	.837	.924	1.021
with chronic illness (n = 228)	Constant	.243	.841			
	IHLC	.064**	.022	1.021	1.067	1.114
	CHLC	.001	.026	.951	1.001	1.055
	PHLC	-.027	.030	.917	.973	1.032
Continue TC practice						
without chronic illness (n = 94)	Constant	.700	4.452			
	IHLC	.021	.124	.801	1.022	1.302
	CHLC	.121	.122	.888	1.128	1.435
	PHLC	.017	.118	.808	1.017	1.281
with chronic illness (n = 227)	Constant	.996	1.117			
	IHLC	.049	.029	.992	1.050	1.112
	CHLC	.015	.037	.944	1.015	1.092
	PHLC	-.011	.040	913	.989	1.070

* $p < .05$. ** $p < .01$

5.6 Attitudes to Tai Chi

5.6.1 General beliefs about the efficacy of Tai Chi as a health activity

Knowledge and past experience create expectations for people that certain activities will bring certain outcomes. Therefore, the participants' beliefs regarding the efficacy of TC as an exercise were investigated through a set of 18 statements, such as "I believe TC is a safe exercise" and "I believe TC is beneficial for physical health". These statements utilized a 6-item scale and encompassed a relatively wide range of components, from physical and mental health to spiritual aspects, as illustrated in Table 5.18. Data collected from 382 respondents were gathered and analysed.

Generally speaking, most respondents had a positive view of TC with the highest proportion in most statements grouped in "strongly agree". The majority of respondents agreed that TC was a safe and enjoyable exercise (99%) and benefited physical health (99%) and body relaxation (98%). Around half of them strongly believed that TC had positive effects on mental health, such as mental relaxation (53%), stress reduction (50%) and anxiety reduction (43%). Additionally, participants also tended to believe that TC would influence an individual's life through the improvement of confidence and energy by helping them to attain more mobility in daily activity and cope with complex daily tasks better, as well as providing a social network. Although nearly 20% of respondents (n = 62) did not rate the impact of TC on spiritual health highly, the majority believed that TC could improve the development of personal positive morals, ethics and values. Remarkably, 95% of TTC members accepted that TC would assist them to be more aware of their health and take responsibility for their own

health status through TC practice. However, 30% of them thought that learning TC would be a challenge for them.

Table 5.18
Percentage Frequency of General Beliefs about Tai Chi (%) (N = 382)

Items	Strongly disagree	Moderately disagree	Slightly disagree	Slightly agree	Moderately agree	Strongly agree
TC is a safe exercise	-	0.8	0.3	3.2	24	71.7
TC is enjoyable	0.3	-	0.8	4.8	26.1	68
TC is easy to learn	3.2	9.4	17.2	29.6	32.3	8.3
TC is beneficial for physical health	-	0.3	0.3	4.3	21.3	73.9
TC helps physical relaxation	0.3	0.5	0.8	8.1	32.8	57.5
TC is beneficial for mental health	0.3	0.8	1.9	15.3	31.4	50.4
TC helps mental relaxation	0.3	0.5	1.6	12.6	32	53
TC helps reduce stress	0.3	0.3	1.9	13.5	34.6	49.5
TC helps reduce anxiety	0.5	0.5	3.2	21.4	32.2	42.2
TC reduces pain	0.8	3	9.9	31	30.2	25
TC provides a social network	0.5	2.2	4	28	32.6	32.6
TC improves concentration	0.3	0.5	3.2	18.2	35.9	41.8
TC improves energy	0.3	-	4	19.6	36.6	39.5
TC improves confidence in getting around	0.8	1.4	4.6	29.7	32.7	30.8
TC improves confidence in performing everyday activities	1.1	2.2	5.8	32.9	29	29
TC helps people handle complex tasks better	1.4	2.2	9.1	37.8	30.4	19.1
TC improves spiritual health	2.7	4.1	10.2	31.6	28.6	22.8
TC assists people to be more responsible for their own health	0.3	1.1	3.8	16.1	38.1	40.6

Exploratory factor analysis (EFA) was, hereafter, conducted to detect the existence of any underlying structure to the 18 items and identify a smaller set of factors for interpretation purposes. Prior to conducting EFA, assumptions, such as sample size, normality, linearity and the presence of outliers, were examined.

Sampling There were 350 valid responses from the initial 382 participants, which were entered into the EFA. Based on the criterion mentioned in the methodology chapter (p. 77), with communalities ranging from .36 to .87 and the ratio of variable-to-factor (5: 1), the sampling of 350 was considered a good sample size for conducting an EFA.

Normality The distribution of the responses to all 18 items was examined using PASW EXPLORE (Allen & Bennett, 2007). This demonstrated that the variables exhibited skewness less than 2 and kurtosis less than 7 and the Normal P-P plot showed that the plots were roughly around the diagonal line, indicating that normality was acceptable (West, Finch & Curran, 1995).

Outliers A box-plot graph was utilized to identify the outliers and extreme cases in the sample. There were two extreme cases and 29 outliers identified out of 350. Further examination was performed by hand, case by case, to assess each individual outlier and extreme cases. This showed that the outliers and extremes occurred in respondents with low scores regarding their beliefs about TC in certain statements. Therefore, in order to maintain the integrity of data, after peer review these outliers were kept for all subsequent EFA.

Once the above assumptions were satisfied, principal components factoring with varimax rotation was performed on the 18 variables. Three factors were identified from

the 18 questions. Inspection of the scree plot graph showed that three factors explained a total of 61% of the variance. However, in order to achieve a high reliable factor solution with a factor loading cutoff of .45, as discussed previously (p. 82), item 3 “TC is easy to learn”, which had a lower loading of .40, was removed from the analysis. After that, EFA was run again with the remaining 17 variables and again all assumptions were satisfied.

The correlation matrix revealed that most correlations exceeded .3, indicating the correlations between each pair of variables were internally consistent and the data were suitable for factor analysis. Additionally, the suitability was further evidenced by the Kaiser-Meyer-Olkin (KMO) values of each variable (.90), Bartlett's Test of Sphericity (p = .000) and the communality values which ranged from .36 to .87, with an average value of .63. All these figures demonstrated that the data were suitable for factory analysis.

Three factors with Eigenvalues exceeding 1were extracted from the 17 questions (see Figure 5.12). It is obvious that the first factor had a remarkably high Eigen-value but the flattening cut occurred after the third factor. Using orthogonal rotation with a factor loading of .45, 17 questions were classified into three factors: Factor1, Factor 2 and Factor 3, as illustrated in Table 5.19, and the three factors accounted for a total of 63% of the variance. Specifically, nine variables were categorized into Factor 1 (27% of variance), five in Factor 2 (23% of variance), and four in Factor 3 (13% of variance). One of the items called “TC helps physical relaxation” was loaded into both Factor 1 (.503) and Factor 2 (.526). More details of each factor are illustrated later. The highest loading was attributed to the statement “TC improves confidence in performing

everyday activities" and "TC is beneficial for mental health" with a loading of .85 whilst "TC reduces pain" was the lowest loading with a value of .48.

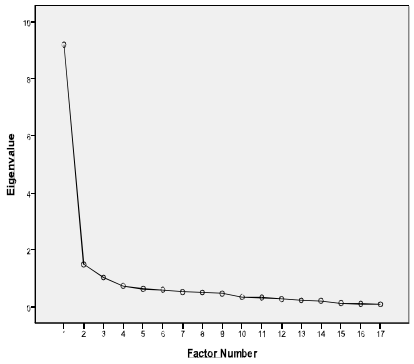

Figure 5.12. Eigenvalues of the factors representing participants' beliefs about Tai Chi (N =350)

Table 5.19
Varimax rotated factor structure of the 17 Items Assessing Beliefs regarding Tai Chi (N =350)

Variable	Factor 1	Factor 2	Factor 3
TC is enjoyable			.645
TC is a safe exercise			.540
TC helps physical relaxation		.503	.526
TC is beneficial for physical health			.524
TC helps mental relaxation		.846	
TC helps reduce stress		.838	
TC is beneficial for mental health		.779	
TC helps reduce anxiety		.755	
TC improves confidence in performing everyday activities	.848		
TC improves confidence in getting around	.817		
TC helps people handle complex tasks better	.796		
TC assists people to be more responsible for their own health	.658		
TC improves energy	.582		
TC improves spiritual health	.564		
TC improves concentration	.559		
TC provides a social network	.489		
TC reduces pain	.476		
Percentage of Variance	26.76%	22.96%	13.04%

Note. Only loading over .45 are presented in the table.

As it was considered that the 17 statements represented as a tool to measure people's beliefs regarding the efficacy of TC practice, the internal consistency of the scale was assessed prior to naming the factors. The Cronbach's alpha for the 17-item scale as a whole was .93. As three factors were extracted, further Cronbach's alpha for each Factor acting as subscales was examined. The result showed that a Cronbach's alpha coefficient of .92 for Factor 1, .94 for Factor 2, and .78 for Factor 3, respectively.

Justification of factor names, Factor 1: Everyday functioning

To better interpret the scale, a descriptive approach was used to name the factors resulting from the EFA. There were nine items included in Factor 1, as follows:

Item 1: TC improves confidence in performing everyday activities

Item 2: TC improves confidence in getting around

Item 3: TC helps people handle complex tasks better

Item 4: TC assists people to be more responsible for their own health

Item 5: TC improves energy

Item 6: TC improves spiritual health

Item 7: TC improves concentration

Item 8: TC provides a social network

Item 9: TC reduces pain

These statements were all related to an individual's daily life, ranging from performing normal everyday activities to social life. The first three items and Item 8 described how confident people are in performing daily activities, while energy and concentration in items five and seven are all basic elements required for people to undertake any specific activity. On first glance, reducing pain seems not to belong to this concept. However, when people are suffering from pain, their capacity to perform common daily functions is impacted greatly. Living without pain is essential for optimal functioning, particularly for a good quality of life. Therefore, item nine "TC reduces pain" is considered to align with the concept of everyday functioning. The sixth item is about the role of spirituality in daily life. Although it is not clear how it is related to

health, it is accepted that body, mind and spirit are connected and are unique to each individual in the way they interact. Individual's values and beliefs directly or indirectly affect everyone's behaviour and performance in daily life. Spiritual health may be reflected by inner peace and confidence to deal with daily life tasks and interact with family and others. From this viewpoint, one's spirituality should be also accounted for when considering the ability to perform daily tasks. In accord with this, the first factor has been named "everyday functioning", which, to a large extent, refers to one's ability to engage in everyday life tasks and interactions.

Justification of factor names, Factor 2: Mental health and well being

In comparison to Factor 1, identifying the core meaning of Factor 2 was more straightforward. There are five statements in Factor 2, as following:

Item 1: TC helps physical relaxation

Item 2: TC helps mental relaxation

Item 3: TC helps reduce stress

Item 4: TC is beneficial for mental health

Item 5: TC helps reduce anxiety

Four of them are related to mental health and well-being and received high loadings of more than .75. These included mental relaxation, stress and anxiety reduction and a positive effect on mental health. Physical relaxation was also identified as belonging to this factor, with a loading value of .50. As the ability to achieve physical relaxation interacts strongly with the other four components in this factor it was

considered that these five statements encapsulated the concept of "mental health and well-being" and was labelled accordingly.

Justification of factor names, Factor 3: Exercise suitability

Factor 3 includes four statements as following:

Item 1: TC is a safe exercise

Item 2: TC helps physical relaxation

Item 3: TC is enjoyable

Item 4: TC is beneficial for physical health

At first glance, these four items loading on the Factor 3 seemed not having an obvious relationship with one another. However, in consideration of how personal preference and perception of a physical activity impacts on an individual's decision to undertake and continue that exercise, these items could reflect various requirements that may encourage a participant to adopt and initiate TC practice. In consideration of this, Factor 3 was named "exercise suitability".

In summary, the three factors identified from EFA are "everyday functioning", "mental health and well-being" and "exercise suitability".

5.6.2 Participants' age and beliefs about Tai Chi

Although the factors extracted have given an overall view of how respondents view TC, the researcher was interested to investigate whether there was a relationship between age and beliefs about TC. Therefore, exploratory factor analysis was run again using two groups, people aged 55 years or over and those under 55 years. This age cut off was used as in many government benefit contexts anyone aged 55 years and older is considered "a senior" or "older adult", such as for example, the mature age worker tax offset in Australia (Australian Taxation Office, n.d.) and eligibility for Retirement Village living open to retirees 55 years and over ("Retirement Villages," n.d.).

There were 260 respondents aged 55 or above (older adult group) and 88 under 55 (adult group). There were similarities in the correlation matrix (>.30) and the total of explained variance was approximately 60% in both groups. However, the number of factors and the excluded variables in a given factor were different, as shown in Table 5.20. In the older adult group, a 2-factor solution was apparent with about 30% of variance explained in each factor. Most questions were loaded on just a single factor, but two variables were loaded onto two factors ("TC reduces pain" and "TC improves energy"). There were nine items loaded into factor 1 and eight items into factor 2. For the factor loadings, there were eight variables with loadings of .70 or over, eight with between .50 and .69, and only two with between.45 and .49.

On the other hand, a three-factor solution was derived in the group aged under 55, in which eight variables were extracted in Factor 1, five in Factor 2 and four in

Factor 3. The total value of variance explained (62%) was slightly higher than that in the older group.

Consequently, it is obvious that participants in different age groups held different perceptions of TC. As the EFA performed in the two age groups was for comparison and interpretation purposes only, the items in a given factor were not named.

Table 5.20

Varimax rotated factor structure of the 17 Items Assessing Beliefs regarding Tai Chi by Age (N = 348)

Variable	Factor 1		Factor 2		Factor 3	
	<55	>= 55	<55	>=55	<55	>=55
TC is a safe exercise					.760	
TC is enjoyable		.539			.608	
TC is beneficial for physical health		.523			.532	
TC helps physical relaxation		.629	.651			
TC reduces pain	.547	.525		.475		
TC is beneficial for mental health		.840	.760			
TC helps mental relaxation		.865	.940			
TC helps reduce stress		.868	.829			
TC helps reduce anxiety		.773	.732			
TC provides a social network				.549		
TC improves concentration	.621			.565		
TC improves energy	.564	.480		.634	.498	
TC improves confidence in getting around	.842			.819		
TC improves confidence in performing everyday activities	.869			.839		
TC helps people handle complex tasks better	.854			.757		
TC improves spiritual health	.503			.606		
TC assists people to be more responsible for their own health	.669			.700		

Note. Only loading over .45 are presented in the table.

5.6.3 Experiences of Taoist Tai Chi™ Society members

5.6.3.1 Perceptions of support and connectedness within the Taoist Tai Chi™ Society

This section investigates how members felt about being a member of the TTCS. A six-item question was used to rate participants' experience of support and connectedness in relation to being a member of the Society. The results are presented with percentages of frequency in Table 5.21. Overall, most respondents had a positive experience within the TTCS. They stated that the Society had provided a safe (85%), supportive (93%) and encouraging (96%) environment to them with a feeling of being among friends (97%), while 93% of participants reported they felt they had been motivated to help others.

Table 5.21
Percentage of perceptions of support in the Taoist Tai Chi™ Society (%)

	Strongly disagree	Moderately disagree	Slightly disagree	Slightly agree	Moderately agree	Strongly agree
I feel at home (n = 353)	3.1	3.1	5.1	27.8	32.0	28.9
I feel supported (n = 354)	1.4	2.0	3.4	21.5	39.5	32.2
I feel safe (n = 343)	2.6	3.5	8.5	26.8	22.7	35.9
I feel encouraged (n = 358)	.6	1.7	.8	14.8	33.5	48.6
I feel among friends (n = 365)	.8	.5	2.5	18.1	37.0	41.1
I feel motivated to help others (n = 354)	2.0	2.3	5.1	25.7	29.1	35.9

5.6.3.2 Relationships between perceptions of support and connectedness and the duration of Tai Chi Practice and attendance at social functions

A one-way between groups ANOVA was performed to examine the impact of participants' perceptions of support and connectedness within the Society on their membership length and attendance at social functions. The assumptions of normality and homogeneity of variance were satisfied.

The results revealed that participants' different feelings in regard to support and connectedness in the Society depended upon the length of time they had belonged to the Society. More specifically, people who had been in the TTCS for 15 years or more reported more strongly a perception of "feeling at home" (F (4,336) = 4.47, $p < .01$, $\eta 2$ = .051) and held more self-perceived responsibility to help others (F (4,337) = 4.45, $p < .01$, $\eta 2$ = .050) than those who had joined within last five years, as illustrated in Table 5.22.

Furthermore, member's perceptions of support and connectedness were also associated with an increased attendance at social events (also see Table 5.23). The ANOVA indicated that when TTC members perceived that the Society provided a supportive and friendly atmosphere and a feeling of being "at home", they were more likely to be involved in social events held by the Society than those who did not. In addition, those who had a strong feeling of being motivated to help others (M = 5.67, SD = .68) also attended the social events more frequent than those who did not (M = 4.25, SD = 1.29), F (4,326) = 13.61, $p < .01$, $\eta 2$ = .143).

Table 5.22
Analysis of Variance for Differences between Perceptions of Support and connectedness and the Years of Tai Chi Practice

Experience in the TC society	*df* *between groups*	*df* *with groups*	*F*	η^2	Year of Tai Chi Practice	Mean	SD
I feel being motivated to help others (n = 354)	4	337	4.45 **	.050	5 yrs	4.63	1.20
					15yrs	5.26	1.06
					20yrs	5.33	1.05
I feel at home (n = 353)	4	336	4.47**	.051	5 yrs	4.45	1.24
					10 yrs	4.93	1.01
					15 yrs	5.08	1.12

* $p < .05$. ** $p < .01$

Table 5.23
Analysis of Variance for Differences between Perceptions of Support and connectedness and attendance at Social Functions

Experience in the TC society	*df* *between groups*	*df* *with groups*	*F*	η^2	Frequency of social functions attendance	Mean	SD
I feel at home (n = 353)	4	326	6.57**	.075	Never	4.24	1.19
					Occasionally	4.78	1.15
					Regularly	5.14	1.15
					Frequently	5.23	1.11
I feel being supported (n = 354)	4	328	4.85**	.036*	Never	4.65	1.13
					Regularly	5.34	.10
I feel being among friends (n = 365)	4	337	12.89**	.132	Never	4.68	1.09
					Rarely	5.05	.89
					Occasionally	5.23	.81
					Regularly	5.62	.60
					Frequently	5.62	.69
I feel being motivated to help others (n = 354)	4	326	13.61**	.143	Never	4.25	1.29
					Rarely	4.64	1.17
					Occasionally	5.02	.99
					Regularly	5.33	.98
					Frequently	5.67	.68

* $p < .05$. ** $p < .01$

5.6.3.3 Relationships between perceptions of support and connectedness and patterns of Tai Chi practice

In addition, an ANOVA was also conducted to investigate the impact of participants' perceptions at the TTCS on the frequency of TC practice and TC class attendance. Visual inspections of the Q-Q Plot and Levene's statistic indicated that the assumptions of normality and homogeneity of variance in the ANOVA were not violated.

The ANOVA was statistically significant, indicating that the attendance at TC class was related to participants' experience within the Society. Respondents with a strong, positive feeling of being at home and among friends, or being motivated to help others attended TC sessions three times or more every week and practised TC more than three times weekly, while those who did not hold such positive perceptions only attended TC session once and practised TC once per week. The detailed statistics are presented in Table 5.24.

Table 5.24
Analysis of Variance for Differences between Perceptions of Support and connectedness and Pattern of Tai Chi Practice

Experience in the TC society	*df between groups*	*df with groups*	***F***	η^2	Frequency of TC session attendance	Mean	SD
I feel at home (n = 353)	3	332	4.15 **	.036*	Once	4.47	1.09
					Three times	5.00	1.05
					> Three times	5.27	.83
I feel being among friends (n = 365)	3	344	5.95**	.049	Once	4.95	.96
					Three times	5.46	.75
					> Three times	5.57	.66
I feel being motivated to help others (n = 354)	3	333	9.45 **	.078	Once	4.52	1.15
					Twice	4.83	1.17
					Three times	5.40	.89
					> Three times	5.32	1.09
					Frequency of TC practice		
I feel being among friends (n = 365)	5	340	3.21**	.045	Once a week	4.89	1.05
					3 times/wk	5.38	.78
I feel being motivated to help others (n = 354)	5	329	6.29**	.087	Every day	5.47	.84
					>3times/wk	5.32	1.06
					3 times/wk	5.19	.96
					Twice a week	4.68	1.14
					Once a week	4.51	1.25

* $p < .05$. ** $p < .01$

5.7 Conclusion

The findings from the quantitative date presented in this chapter have described the characteristics of TTC practitioners in WA and the patterns of TC practice most commonly used, as well as their experiences within the TTCS and beliefs regarding TC as a physical activity. Predictive factors associated with patterns of TC practice were also presented. Overall, the majority of TTC practitioners were older Australians with a Caucasian background, female, retired, well-educated, and living in metropolitan areas and were more likely to report chronic medical conditions, including CVDs, MSDs and psychological conditions, such as anxiety and depression. Certain people who were older, female and those with chronic illness were more likely to hold a low internal HLC. The 108 movement Yang-style TTC was practised commonly in morning classes, twice per week for a period of 60 to 90 minutes per session in TTC clubs with other TC practitioners. The majority of practitioners in the study had commenced TC in the last ten years and had an average of 6.4 years experience of TC practice. Most TTC practitioners reported positive experiences and held perceptions of support and connectedness in relation to the TTCS. They generally believed that TC could improve their physical, psychological and spiritual health, in addition to improving aspects of their social life. This, in turn, influenced them in continuing their TC practice.

The next chapter will present findings from the qualitative data related to the participants' expectations of TC and their perceptions of the effects of TC on their health and well-being, as well as the barriers they experienced in TC practice.

CHAPTER 6 PRACTITIONER'S EXPECTATIONS AND PERCEPTIONS REGARDING TAI CHI: FINDINGS FROM AN ANALYSIS OF THE QUALITATIVE DATA

6.1 Introduction

The qualitative data presented in this chapter was gathered from four open-ended questions. These questions served as a vehicle for the participants in this study to disclose, in depth, what their personal expectations of Tai Chi (TC) were on commencement of TC practice and their perceptions regarding the effect of TC on their health and life once they were practising TC, in addition to any discouraging factors they experienced or perceived. The four questions are listed as follows:

- What were your main expectations when you first began practising TC?
- Please describe the three main benefits you have experienced as a result of doing TC;
- Please describe any unanticipated benefits you receive [or have received] from doing TC; and
- Please describe anything which may have discouraged you from doing TC.

Data analysis commenced with repeated reading of all answers gathered to obtain an overall sense of participants' responses. With this overview in mind, overarching themes that reflected each question were identified, based on the

knowledge gained from the existing literature. The units of analysis were phrases contained in sentences within the responses to the question. These phrases were identified using codes developed by means of an iterative technique of constant comparison and after discussion of the content between the researcher and her supervisor. Those coded elements similar in underlying concepts were grouped together into categories. Then, meaningful categories were further clustered together to develop subthemes within the pre-identified themes. For instance, in Question 2 in relation to benefits received from TC, one category, "symptom control", emerged from the coded elements, such as "TC reduced pain", "TC reduced blood pressure" and "TC reduced joint stiffness". The category was then merged with another conceptually related category, "rehabilitation", to form the subtheme of "to assist disease management" under the theme of "physical health benefits'. Finally, the categories were numerically identified and entered into the computer as variables for descriptive analysis using the Predictive Analytics Software (PASW) Statistics to enable comparison with the quantitative findings presented in the previous chapter in discussion chapter.

There were 2373 coded elements in total identified from the participants' answers to the four questions and the frequency of codes varied with the content of each question, as illustrated in Figure 6. 1. Question 2, associated with perceived benefits from practising TC, contributed the largest number of coded elements, whilst the least number was in response to Q4, which was related to perceived barriers to TC practice. The meaning of a small number of phrases [n= 17] within the responses were

unclear due to either misspelling, or writing and meanings that were difficult to interpret, and others [n= 25] were identified by the researcher as having answers unrelated to the question being asked. These were excluded from the coding process, descriptive data presentation and the final interpretation.

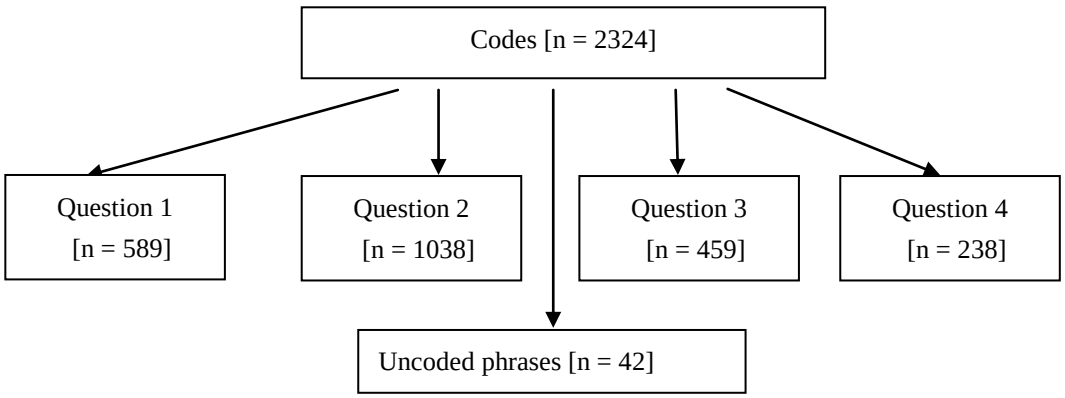

Figure 6.1. Frequency of codes derived from the content analysis of participant responses (N = 382)

The details related to each theme relevant to each open-ended question, along with its associated subtheme, categories and codes, are now presented. Quotes gathered from the participants' answers are used to support each category and subtheme developed.

6.2 Participants' Expectations of Tai Chi

The first open-ended question, which aimed to ascertain the expectations held by the respondents on commencement of TC with the International Taoist TC Society (TTCS) of West Australia (WA), assisted with understanding people's potential motivations when seeking out a physical activity, such as TC.

The participants' responses embraced three prominent themes related to what they expected to obtain from TC practice. These included their expectations regarding : 1) physical health; 2) mental health; and 3) social life. The three conceptually different themes, along with the frequency of coded elements contained within each theme, are presented in Figure 6.2.

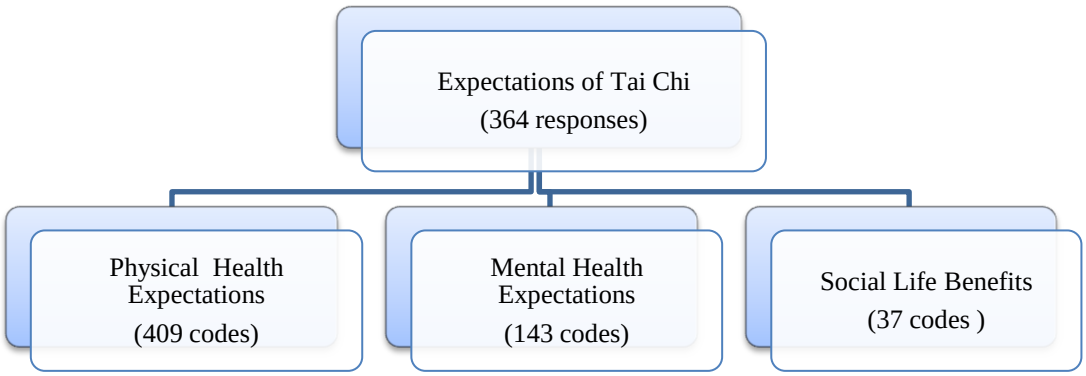

Figure 6.2. Thematic structure of participants' expectations of Tai Chi ((N = 364)

As the coding process of what the participants expected to achieve from TC progressed, the categories and associated subthemes based on how different coded elements were related and linked emerged across the three themes. A diagrammatic model in the form of a dendogram (see Figure 6.3) is used to show how the categories and themes were related to one another. Additionally, each of the categories that emerged was also counted and given numerical representation (Figure 6.4) to provide a visual image of the prevalence of each specific expectation across the whole group of the participants. This figure shows that expectations were most frequently related to: 1) improving general health and well-being; 2) improving physical function in balance, flexibility, muscle strength and mobility; and 3) finding a suitable exercise.

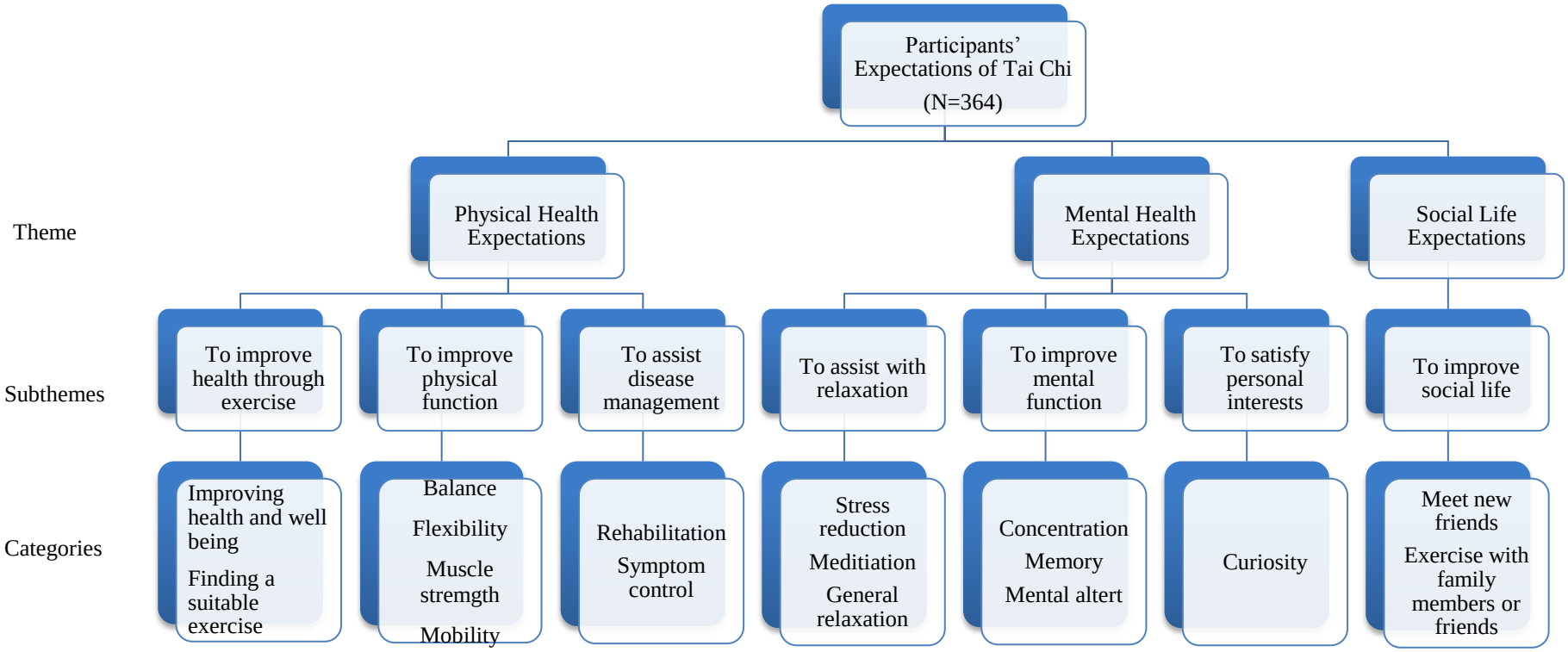

Figure 6.3 Themes, sub-themes and categories for responses to the question "What were your main expectations when you first began practising Tai Chi?"

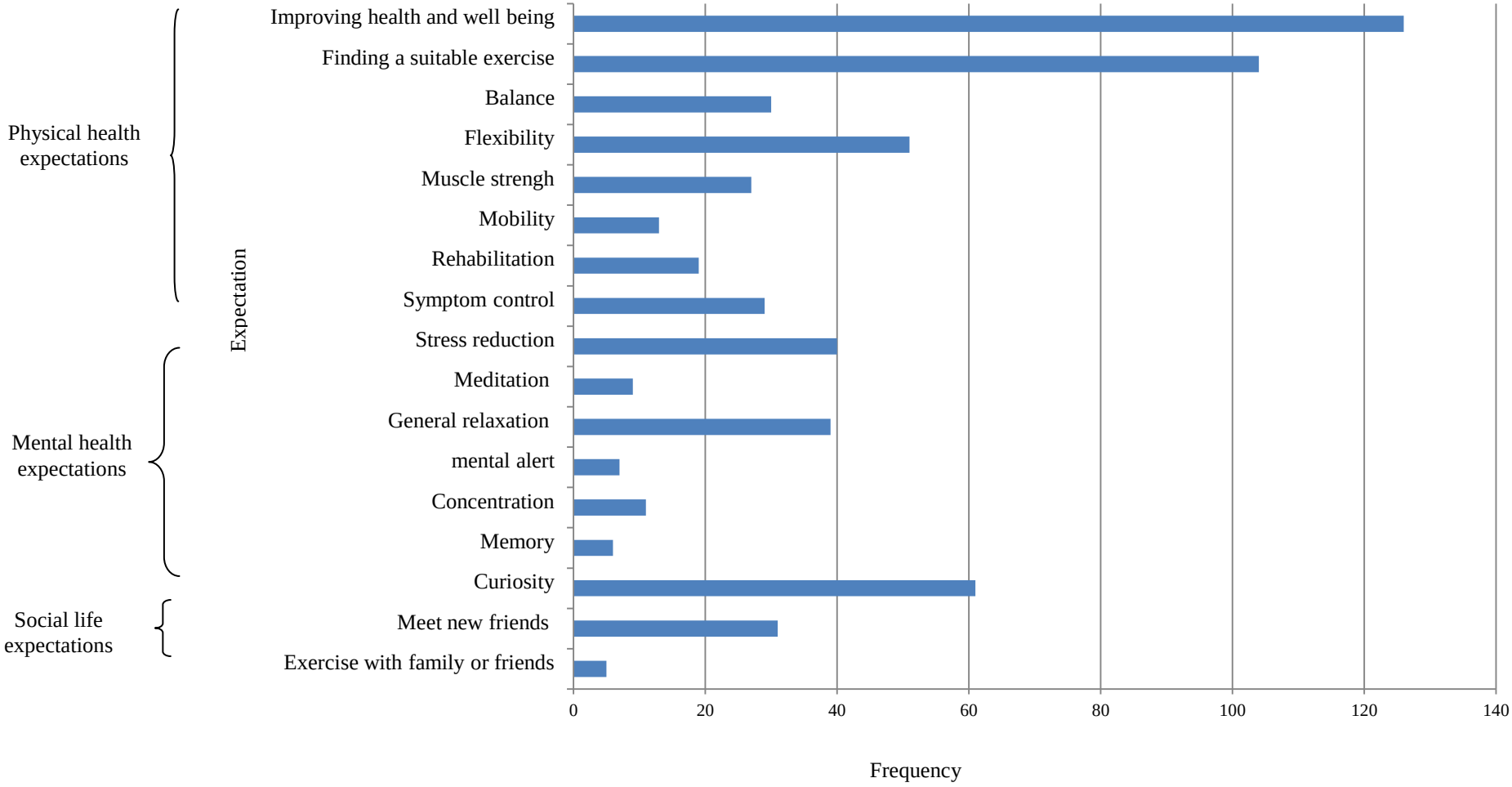

Figure 6.4. Frequency of responses in each of the categories related to expectations of Tai Chi

6.2.1 Physical health expectations

Many of the participants expected that they could achieve a wide range of physical benefits through TC practice with responses related to this theme contributing the largest number of coded elements in the questions' responses. The physical benefits they expected could be further divided into three sub-themes as follows:

- To improve health through exercise;
- To improve physical function; and
- To assist disease management.

6.2.1.1 Expectation: To improve health through exercise

The majority of participants in this study expected that TC, as a new form of exercise for them, could assist with improving their general health and well-being. This exercise would help them participate actively in some kind of physical activity and also benefit both physical and mental health. However, compared to traditional forms of exercise, they hoped this new exercise, TC, would be less physically demanding whilst also assisting with mental health and relaxation.

> *"To participate in an activity that would have both physical and mental health benefits" Respondent 146*
>
> *"To be able to participate in a form of exercise that wasn't linked to a health gym and would be of benefit mentally & physically to me" Respondent 129*
>
> *"This [TC] would give me a constructive way of taking some quiet times during the day which would benefit my physical & mental well-being" Respondent 316*
>
> *"[To] improve physical fitness without having to do rigorous exercise" Respondent 17*

Some participants said they were looking for a form of exercise that was gentle with less physical demands and would satisfy their individual situations related to restrictions they experienced due to aging or illness. They hoped that TC would be an appropriate exercise to meet their multiple needs and keep them physically active.

> *"I had a special operation in 2003 which left me with severe chronic pain & poor balance. As I could not participate in any acuter exercise, I chose to do TC" Respondent 11*

> *"To learn a new way of exercise that was more relaxed than the normal exercise routine I had" Respondent 206*

In some cases, they were seeking a type of exercise that would not only benefit physical and mental health, but also their spiritual health.

> *"I was looking for a moderate exercise with a spiritual aspect" Respondent 192*

> *"To become wiser, calmer and more relaxed, finding a form of exercise which is more intelligent and meaningful [the gym does not give me that feeling" Respondent 24*

> *"My initial expectations were spiritually based but the training is mind, body, spirit so the other two were a bonus" Respondent 382*

6.2.1.2 Expectation: To improve physical function

In addition, many participants, particularly the elderly facing a decline in physical function and an increase in risk of falling, also expected TC to be able to help them improve in this area. Four specific categories were identified: increasing joint flexibility; strengthening muscle; improving balance; and enhancing mobility. The terms "flexibility", "balance', "muscle strength' and "mobility" were commonly used by the participants and were used in relation to walking and movement, reflecting the theme of "physical health expectations".

"Strengthening core muscle groups to better support my back [and] maintaining flexibility with stretching and control of main muscle groups" Respondent 25

"I expected to improve my balance and maintain maximum joint flexibility consistent with the ageing process" Respondent 99

"I started TC not expecting a great deal, mostly I thought it would improve my joint mobility and maybe improve muscle strength" Respondent 254

"Hoping for help with hips as their range of movement was deteriorating, especially as the day wore on- I was finding it hard to move freely on standing. General leg strength was decreasing so was also hoping for improvement" Respondent 100

6.2.1.3 Expectation: To assist disease management

Those participants who were suffering from either a recent or chronic illness held expectations of TC, related to their disease management, to assist with rehabilitation and control of symptoms. Rehabilitation was more likely to relate to their recovery process following surgery or injury. The facilitation of a good recovery was a common expectation.

"That I would improve my physical capacity following a back injury [disc prolapsed] i.e. regain confidence, improve my balance, manage pain, and enjoy moving. Also to facilitate muscle balance and reduce muscle spasm by facilitating good chi flow" Respondent 257

"I was convalescent: post sudden onset of illness. I was looking for improvement in my mental & physical health, especially concentration & balance & belonging" Respondent 203

Others who were suffering from chronic illness hoped to better manage their symptoms with the assistance of TC. Specific symptom control expected by respondents included reduced pain and a sense of joint stiffness, lower blood pressure and blood sugar level, and increased lung capacity. Pain relief was the most common

expectation and referred to a variety of body symptoms including back, shoulder, knee and hip pain, and headaches.

> *"To alleviate symptoms of chronic back pain" Respondent 182*
>
> *"To improve physical health (neck pain, some joint pain)" Respondent 73*
>
> *"My main expectation…eases stiffness in back & shoulder that comes from computer work" Respondent 26*
>
> *"Possible lowering of blood pressure" Respondent 160*

In a few cases, due to the positive affirmation from health professionals or others, participants tried TC to assist with their chronic disease self-management.

> *"I had heard it was good for preventing arthritis and helped people with arthritis and was a good general exercise" Respondent 174*
>
> *"I found, when asked to join in, I could not do the very basic arm movements without pain. This made me seek help eventually. I went to a chiropractor I found out I had a lot of old problems in my neck and low back. After about 3 months of treatment, I said I wanted to try TC, my chiropractor said "good--you will see me less if you do" Respondent 38*

6.2.2 Mental health expectations

The second main theme related to an expectation of improved mental health. The three main benefits expected in relation to this that emerged from the data were:

- To assist with relaxation;
- To improve mental function; and
- To satisfy personal interest.

6.2.2.1 Expectation: To assist with relaxation

There were many comments about the stress that participants were experiencing in their daily life and work and their need for stress reduction, particularly for those who had already been suffering from anxiety and depression.

They expected TC would alleviate their stress and anxiety level through relaxation and have a positive effect on their mental health.

> *"Hoped to become calmer and less stressed and improve my health" Respondent 81*

> *"Time away from the noise and stresses of my family" Respondent 15*

> *"Needed a means of relaxation to reduce mental issues (stress/worry)" Respondent 124*

> *"I hoped it would improve my mental health as I was suffering from depression" Respondent 72*

In addition, as discussed earlier in the Literature Review, TC is often referred to as "moving meditation". Participants considered TC as a different form of meditation and, through practising, they would be able to gain inner peace and stillness. This concept was alluded to by some participants.

> *"Just joined to try a different form of active meditation" Respondent 106*

> *"Practise meditation and gain peace, move with people my own age doing a safe activity" Respondent 163*

Others viewed TC as a relaxation technique, which would help reduce tension and strain from both the body and mind and thus improve physical performance in daily life activities. The word "relaxation" was used frequently by many participants in their answers, usually in relation to a sense of general relaxation rather than specifically either mental or physical relaxation. A number of participants explained,

> *"It would help me to relax and relieve tension" Respondent 103*

> *"I wanted to learn to relax and "switch off"" Respondent 75*

> *"Relaxation, learning through practicing TC how to be calm when doing everyday tasks or in stressful situations" Respondent 188*

6.2.2.2 Expectation: To improve mental function

Improving mental function was another aim outlined when taking up TC. Specifically, participants hoped TC would improve their memory and ability to focus and concentrate, although most comments given in relation to this topic were brief with few details. The most common words identified referred to "memory", 'concentration" and "mental stimulation" in the context of improved mental functioning.

> *"A mental challenge and stimulation in learning the sequence of moves" Respondent 44*

> *"Improvement in memory -focused learning" Respondent 149*

> *"Develop a peaceful mind, calm, better focus and concentration for my work" Respondent 271*

The reasons why the participants thought TC could improve their ability to focus and memorize was not investigated.

6.2.2.3 Expectation: To satisfy personal interests

Although TC has been a common form of exercise for centuries in China, participants' answers indicated that for the people who are living in the West, TC is still regarded as a new form of exercise that stimulates curiosity and personal interest, particularly if they had previously had a chance to watch a demonstration of TC or had heard others talking about its benefits.

> *"To learn TC, which I have been interested in over the years but did nothing till now, as I feel [this] was meant to be the right time" Respondent 190*

> *"I had heard it was beneficial to one's health & enjoyable, so was curious to see if this was true" Respondent 58*

"I just wanted to be able to experience the rhythmic movements. I had seen a group set performing some years ago" Respondent 247

"I just went to a demonstration thought it looked good. I want to do some form of exercise and the people were very friendly" Respondent 219

6.2.3 Social life expectations

Although social life was not mentioned as often as the expectation regarding physical and mental benefits there were some participants who hoped to utilize TC and TC clubs as a platform to increase their social interactions. Two aspects of socialising were identified in the responses to help them achieve this purpose: to meet new friends and to exercise with their friends and family.

6.2.3.1 Expectation: To meet new friends

Meeting different people and making new friends outside their normal social circle was identified by some participants while others wanted to be involved in a group- or community-based activity. By doing this, they could obtain a sense of belonging to a community.

"New social network outside work" Respondent 232

"To participate in a group activity & be part of a club, to join like-minded people, [and] to be part of a friendly [and] caring society" Respondent 189

"Widening the number of people I knew locally" Respondent 378

6.2.3.2 Expectation: To exercise with family and friends

Whilst some participants actively sought out TC for themselves, a few were encouraged to accompany friends or family members. In this circumstance, some regarded TC practice as something they could do as a family and share together, while others viewed it as a way to improve connectedness by being with their friends.

"I did not really know what I expected, I only did it because my friend wanted to go and give it a try" Respondent 171

"A shared interest and activity with my wife" Respondent 44

"Meet new people and learn something I could practise anywhere with my husband (who is learning with me)" Respondent 338

In brief, the TC practitioners held a wide range of expectations based on individual situations and needs on commencement of TC. The expectations focused primarily upon improving their general health status and enhancing physical and mental functions. For those suffering from illnesses, they hoped TC would be an effective means of assisting in disease management whilst some participants also expected that, through practicing TC with other TC practitioners at a TC club, this would help to build a new social network for them.

6.3 Benefits Experienced from Practising Tai Chi

Responses to the second and third open-ended questions revealed many of the participants in this study held a variety of perceptions regarding the benefits gained as a result of TC practice. There were 1038 identified coded elements related to main perceived benefits received from 366 respondents to Q2, which contributed the largest number of coded elements in this section of the study. These benefits described were representative of improvements in their physical and mental health, as well as their social life, with respondents often identifying benefits related to more than one theme. However, the majority of the participants [n = 306] who experienced these benefits reported them as an unanticipated bonus in Q3, with 459 identified coded elements. Codes were categorised under the three major themes as illustrated in Figure 6.5, with

the frequencies of codes related to either benefits or unanticipated benefits. The Figure indicates that, overall, many more comments were made in regard to the benefits of physical health and well-being in comparison to that of mental health and social life. Also it shows most physical benefits were expected by the participants, while the majority of benefits related to social life were not initially anticipated.

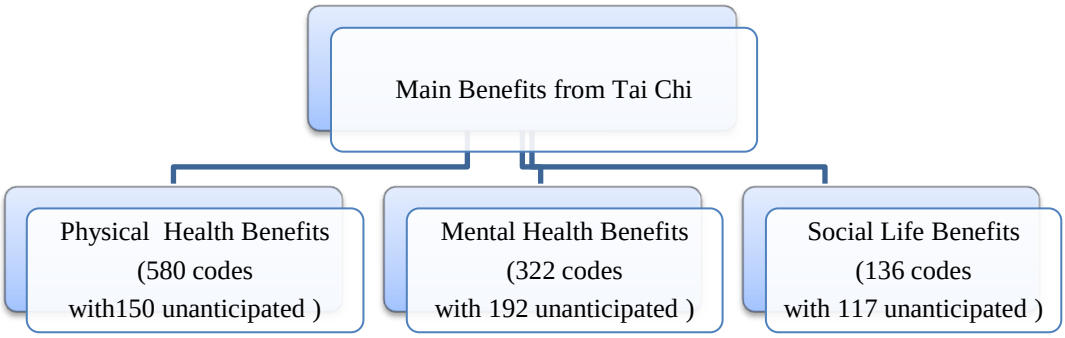

Figure 6.5. Thematic structure of benefits experienced from practising Tai Chi

Following analysis of the responses and subsequent classification of the coded elements, twenty-four categories were identified and presented (see Figure 6.6), in which the Series1 bar lines represent the main benefits received and the Series2 ones symbolize unanticipated benefits. The category of "new skill" only appeared in unanticipated benefits and "less medical intervention" and "facilitated exercise" were only reported in the main benefits question. The most commonly identified benefits were in relation to physical health although relaxation and making new friends were also clearly important for many of the respondents. However, it is important to note that there was a considerably different focus in the two questions. That is, in Q2 the majority of benefits perceived by the participants related to physical health, while the

unanticipated benefits in Q3were predominately associated with the attributes of self esteem and social life. These categories were then integrated into seven subthemes across the three major themes, as outlined in the dendrogram (see Figure 6.7).

All themes, subthemes and categories in relation to these benefits perceived by respondents are now presented in detail in conjunction with supporting quotes from the participants' writing answer.

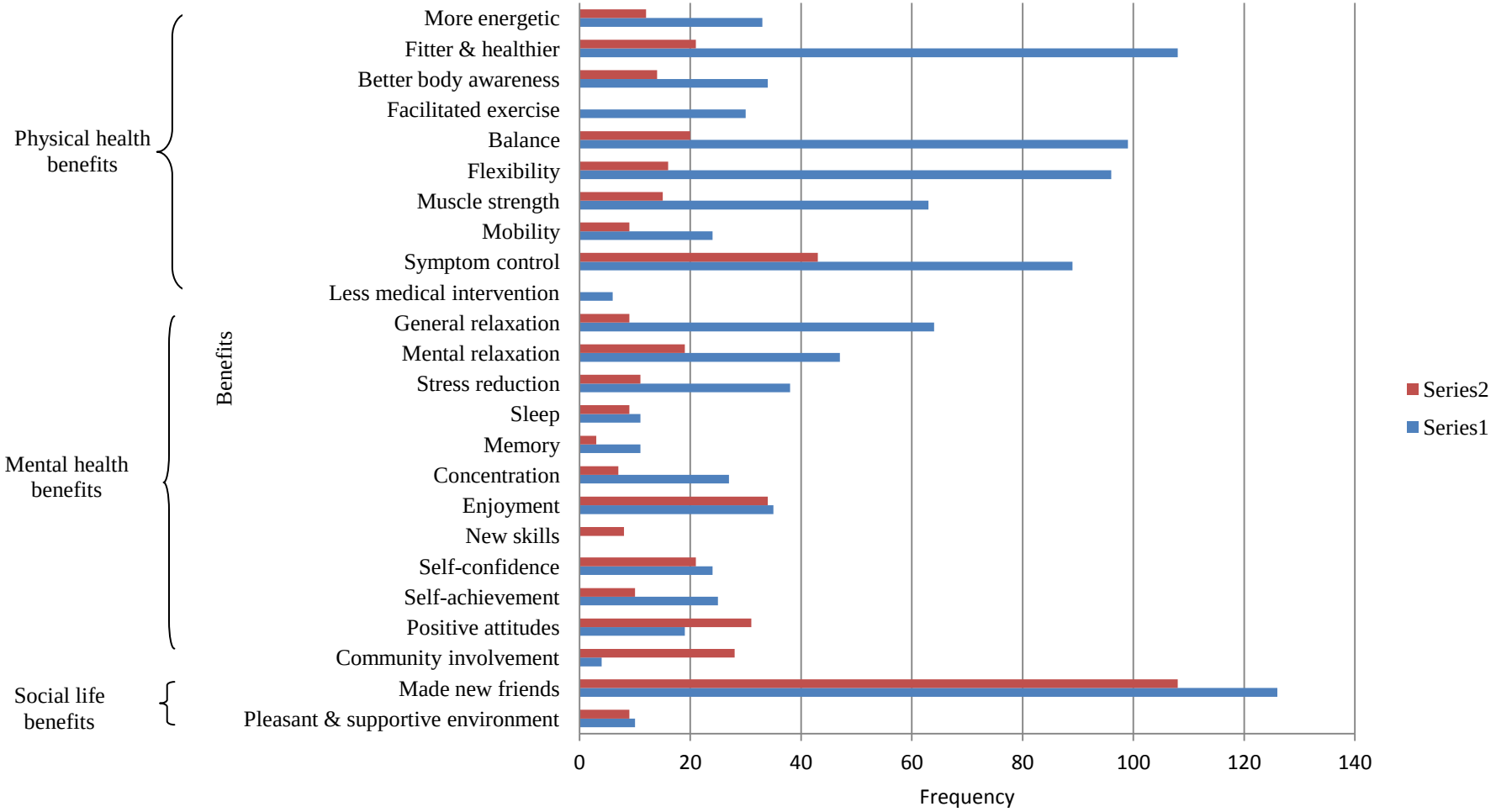

Figure 6.6. Frequency of responses in each of categories related to the benefits received from Tai Chi
Series 1 = benefits received, Series 2 = benefits unanticipated

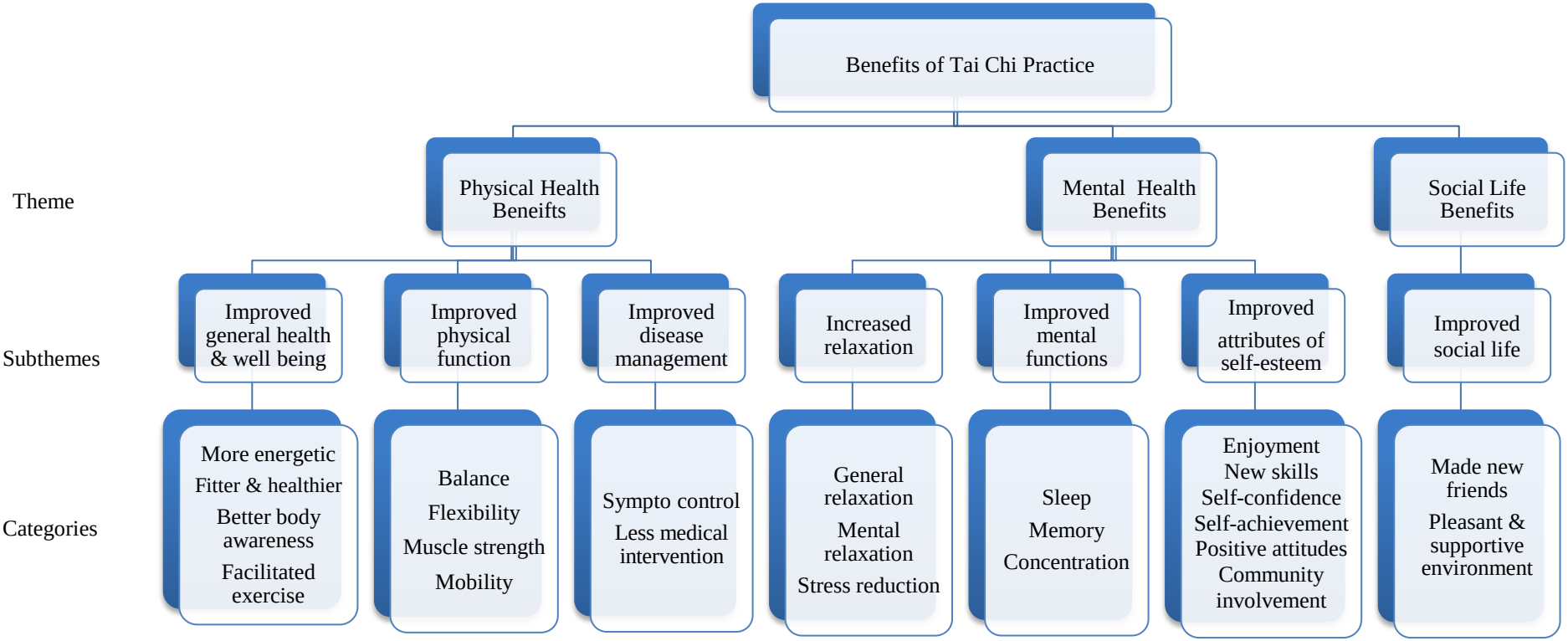

Figure 6.7. Themes, subthemes and categories for benefits and unanticipated benefits experienced as a result of doing Tai Chi

6.3.1 Physical benefits

Many participants reported a wide range of physical benefits that were classified into three sub-themes as follows:

- Improved general health and well-being;
- Improved physical function; and
- Improved disease management.

Respondents frequently mentioned improvements in their general health status and physical function, particularly in regard to motor function. Better symptom control was another main benefit, which in many had been unanticipated particularly in regard to pain relief. Many of the physical benefits perceived by participants, such as those associated with general health, had been an expected outcome in relation to TC practice, however, for some, the benefits they received had not been foreseen.

6.3.1.1 Benefit received: Improved general health and well-being

Most participants reported their general health had improved since they commenced TC. Many of them felt healthier and fitter than before, whilst others reported feeling higher levels of energy. Noticeably, some older participants found that age-related changes associated with physical function had been arrested or alleviated by practising TC, which they felt was essential in maintaining their independence as they aged.

> *"I felt that my physical and mental health has improved. I consider that TC has kept my joints and muscles supple for a person of my age" Respondent 229*

"Able to gain more energy and feel better and able to exercise more freely--Feel generally better" Respondent 97

"Ageing has caused some deterioration to my physical health. I feel better after attending [TC] classes" Respondent 114

"Better circulation, particularly to the feet & hands. I no longer have persistently "cold" feeling in winter" Respondent 100

"At my age I am physically more fit than I had ever experienced before. I can overcome physical & mental setbacks quicker, keeping my independence is important too" Respondent 126

In addition, TC had enabled respondents to be aware of their body posture when moving and lifting. They reported learning more about how to shift body weight correctly and this had effectively enabled them to maintain a good posture during TC sessions. This awareness and knowledge not only improved the body balance and safety necessary to avoid exercise-related injury during TC practice, but also allowed them to apply what they had learnt in everyday life and work activities. This resulted in an ability to reduce injury consciously during physical activity and improve function.

"[I have] *learnt how to move & exercise without aggravating injured knee & shoulder, which helps also perform my work duties because I am able to think about how to move without hurting my knee and shoulder. Both are long term work injuries" Respondent 17*

"Physically I have learnt how to use my body more kindly and more effectively to maintain and improve flexibility and balance" Respondent 326

"I am moving correctly. I think more before lifting things. I feel confidence when moving in the garden & on my morning walks" Respondent 65

"I have learnt how to release tension in specific muscles at will—more awareness of my body functions" Respondent 95

Some participants also mentioned that TC was a gentle and enjoyable exercise, without rigorous physical demands and this motivated them to continue TC practice. Furthermore, attending TC sessions on a regular basis facilitated TC practice as a

regular part of their daily life activity that was easy to undertake at home and brought them a "feeling of well-being (*Respondent 34)*".

> *"TTC provides a "passive" form of exercise without too much exertion" Respondent 62*
>
> *"Provided me with something enjoyable to do at home" Respondent 39*
>
> *"[I am able to] maintain a regular exercise routine by attending continuing classes" Respondent 50*
>
> *"Feeling of well-being with regular exercise of TC -physical and mental" Respondent 182*

6.3.1.2 Benefit received: Improved physical function

Many participants reported that, as expected, their physical function regarding motor ability had increased as a result of TC practice. They described this increase as being due to improvements in their balance, flexibility, and muscle strength. Firstly, some participants found their ability to maintain their body balance and coordination was significantly improved and their movements were more stable and smoother. Some of the changes were so obvious that it was remarked upon by their family and friends.

> *"Doing TC has had a good effect on "grounding" my body, i.e.: my sense of balance and control of balance has become very obvious" Respondent 211*
>
> *"My coordination and balance have greatly improved" Respondent 272*
>
> *"My hip joints have lost the bit of "stiffness" that was creeping in, and my daughters have commented on the improvement in my gait" Respondent 156*
>
> *"My balance has improved. My walking is smoother (my wife says that I previously "waddled")" Respondent 87*

Other respondents commented on the changes in their flexibility. They noticed that their range of movement and their ability to stretch had improved greatly, such as

reaching and grabbing objects previously out of their reach. This improvement impacted significantly on their ability to perform their daily tasks and made their life easier.

> *"Increased range of movement without pain and better balance & flexibility" Respondent 298*
>
> *"Increased flexibility in my whole body especially injured areas--lower back, middle back, neck, knees & right ankle" Respondent 282*
>
> *"[I] can do danyus [similar to squats] to reach lower kitchen shelves for gardening, instead of bending back or kneeling" Respondent 178*
>
> *"I can look behind much better when reversing vehicle." Respondent 193*
>
> *"I can pick up objects from floor" Respondent 32*

Muscle strength was another aspect of motor function reported to have improved with TC practice. This improvement was more likely to relate to the lower extremities and the back and was considered to assist with better balance and pain reduction. Some participants believed their age-related deterioration and muscle tension were also alleviated.

> *"It has really improved my leg strength and has really helped with keeping my back stretched & reducing pain" Respondent 83*
>
> *"I have much greater leg strength which helps balance, and reduced knee pain as I now have thigh muscles that work" Respondent 39*
>
> *"My legs are stronger and my knees no longer hurt if I sit for extended periods" Respondent 121*
>
> *"The gradual strengthening of areas of my body which had deteriorated over time" Respondent 162*

Additionally, comments regarding the effects of improved mobility on daily activities were common. Participants described their movement as more free and easier.

"I noticed improvement in the first 2 weeks I noticed I was walking better, especially 1st thing in the mornings when I first got out of bed. Prior to TC I moved like 80 yrs old. Suddenly I was walking ok" Respondent 314

"The fact that others noticed I had more vitality. I have always walked an hour and a half a day and then neighbours were the ones who first noticed I was moving far more easily than I had before TC" Respondent 207

6.3.1.3 Benefit received: Improved disease management

Participants who were suffering from health conditions commented on the effects of TC predominately in regard to their disease management. They found that TC practice not only aided their recovery process following surgery or injuries but also, in a few cases, some noted their use of medicines and visits to health professionals, such as physiotherapists and doctors, had either reduced or ceased.

"Neck –physiotherapist visits reduced from 4 per year to 1 per 2 year (quite amazing result)" Respondent 187

"My back has improved, no end to the point where I am not at the physiotherapist & chiropractor every week or so" Respondent 309

"I was no longer taking medication for my rheumatic arthritis. My legs have become stronger, so has my balance" Respondent 219

"Returned movement of limbs after surgery" Respondent 66

"Rapid internal healing after major abdominal surgery" Respondent 375

"Real help recovering from first a badly dislocated elbow and the following year, a shoulder reshaping operation" Respondent 231

Others found that medical symptoms associated with a variety of conditions, such as high blood pressure, muscle stiffness, heart rate, and even bowel function, were reduced or even eliminated, particularly in pain relief, which led to perceived improvements in daily performance.

"The main benefit for me has been a reduction [in] back pain. I often could not stand for long without pain, but that has been reduced" Respondent 29

"My knee has no more pain; more flexibility and stronger. I can run and play other sports now (I could hardly run after knee injury –e.g.: cartilage problem)" Respondent 249

"It has shown me a new way to relax - prior to starting TC I had high blood pressure but this is now normal. Of course other factors such as meditation etc also influence this" Respondent 83

"My hip has gone back in place so no operation! Wonderful" Respondent 217

"Helps with keeping blood sugar levels [stable]" Respondent 119

"Largely overcome chronic fatigue syndrome" Respondent 344

"Thyroid function test mainly within normal range now" Respondent 49

"Improved bowel function (very unanticipated) and menstruation with less cramping & much lower blood loss" Respondent 213

6.3.2 Psychological benefits

In addition to the physical health benefits perceived, many participants also believed that as a consequence of TC practice they experienced improvements in their psychological well-being and mental functioning. They believed TC had promoted their ability to relax, thus enabling them to calm down and enjoy a state of relaxation, which, in turn, reduced their feelings of stress that they confronted in daily life and work. Of particular interest were the unexpected benefits reported by participants that could be attributed to an improvement in self-esteem. This is discussed later in more detail. These psychological benefits outlined by respondents were divided into three subthemes as follows:

- increased relaxation;
- improved mental functions; and
- improved attributes of self-esteem.

6.3.2.1 Benefit received: Increased relaxation

Physical and mental relaxation is an integral part of health and well-being. Many participants reported a feeling of being more relaxed and calm when practising TC and that feeling also extended to their everyday lives. This increased ability to relax mainly related to mental relaxation, but other benefits in this area were also reported in relation to an improved ability to alleviate muscle tension, manage stress, and gain better quality sleep.

> *"Another benefit is mental relaxation. TC is really a sort of moving meditation & concentration on remembering the moves is the focus that helps the brain relaxation" Respondent 29*
>
> *"More relaxed, especially when doing TC or even just thinking about it" Respondent 17*
>
> *"I do spend the rest of my TC day more relaxed and usually sleep well at night" Respondent 196*
>
> *"I have a strategy of doing a set of TC and it releases stress from my body" Respondent 316*
>
> *"Improved [my] ability to relax" Respondent 183*
>
> *"I feel more relaxed & calmer than I have for years" Respondent 290*

Respondents also reported that the intense focus required during TC practice enabled them to be distracted from stressful situations, thus diminishing their stress. This benefit impacted significantly on some people's coping skills both in everyday life and work-related stress and pressure.

> *"An ability to slow my mind & be calmer in stressful situations" Respondent 301*
>
> *"Provided a focus away from personal issues with concentration on TC movements" Respondent 124*
>
> *"I have been doing TC on and off for over 10 years, I notice a greater appreciation and improvement in my ability now that I have left my*

excessively stressful job. Although TC cannot overcome some excessive pressures of modern life, it can help to reduce them" Respondent 85

"Spiritual peace -faith in human nature of like minded nice souls (helped me make life changing decisions i.e.: leaving work etc)" Respondent 358

"I have found my mind to be calmer and I can understand problems and conflicts with greater clarity. I have become more relaxed, with a greater sense of play (esp.: in learning new physical activities.)" Respondent 271

In some cases, participants living with anxiety and depression found TC helped them manage their symptoms more effectively. Some participants attributed this improvement to TC's "relaxing and meditative effect" *[Respondent* 378].

'being able to handle my anxiety - calm my mind" Respondent 275

"Better management of stress, less anxiety and sleep better" Respondent 278

"When I learn in class I don't think of anything else for the time I am there. Suffering depression I may feel like not going. I push myself to go and after class I feel energised, more alert and better about myself and reduction of anxiety after class…[I did not expect the]ability to focus on nothing else during class. Working the body and learning TC, after class [this] would relieve my depression and anxiety and felt improved mood that would last the day" Respondent 277

6.3.2.2 Benefit received: Improved mental function

In addition to relaxation and stress reduction, a smaller number of participants identified improvements in mental functions, such as concentration, sleep and memory. They often reported a better sleep on the night of a TC session.

"Very peaceful night's sleeps after a session" Respondent 188

"I do spend the rest of my TC day more relaxed and usually sleep well at night" Respondent 196

"Better focus/concentration" Respondent 362

"At my age memory is improving, not deteriorating" Respondent 9

6.3.2.3 Benefit received: Improved attributes of self-esteem

Participants also reported improvements in the areas that reflected attributes related to improved self-esteem. This subtheme was developed with guidance from Rosenberg's self-esteem theory and Tafarodi's dichotomy classification of self-esteem, as previously discussed in the literature review. The attributes emerging from participants' responses, which formed the dimension of self-liking, were enjoyment, a sense of community involvement and a positive attitude. Whereas the attributes associated with self-competence were identified as self-confidence, self-achievement and mastery of new skills (Figure 6.8).

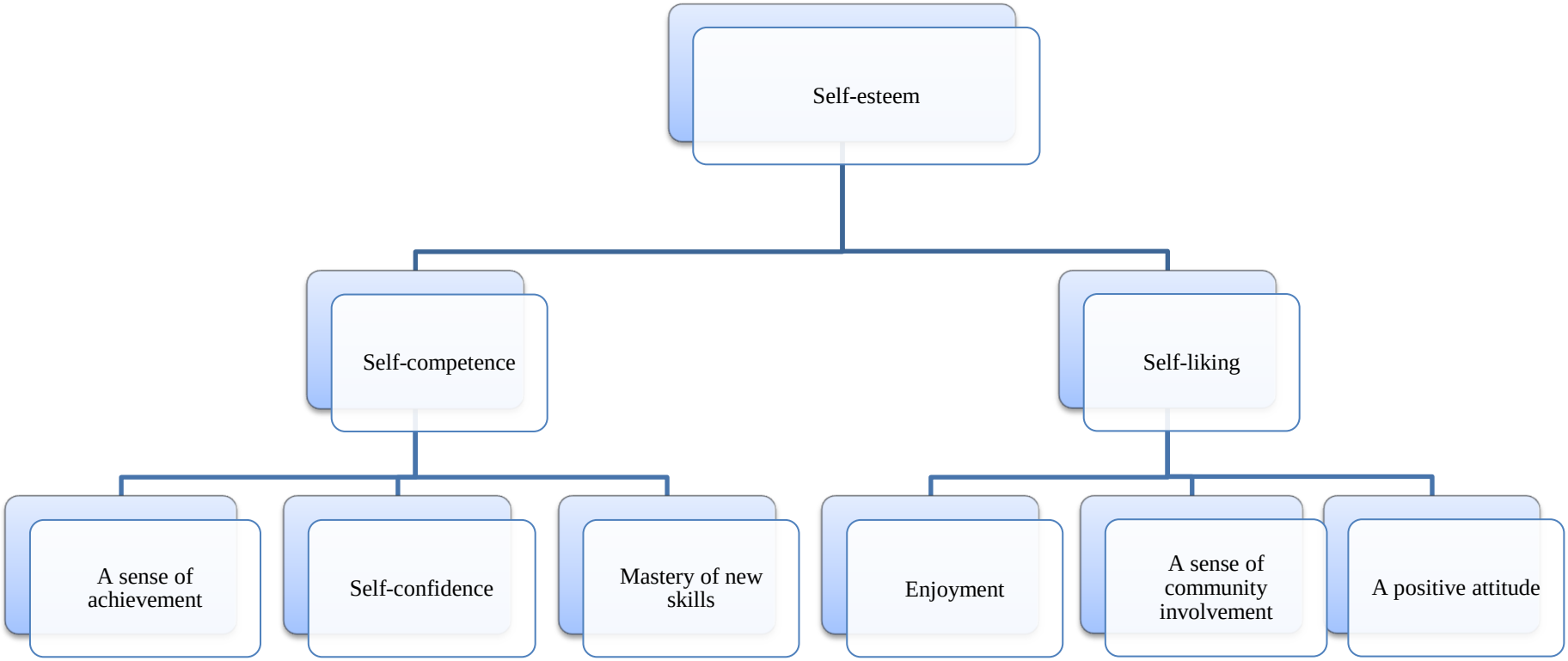

Figure 6.8. Attributes of self-esteem reported by Tai Chi practitioners using Tafarodi's classification of self-esteem

Through TC practice, many participants experienced a feeling of enjoyment that they attributed to a range of reasons. These varied from TC itself as a form of exercise to the friendly atmosphere and a sense of belonging. Some of these feelings were derived from individual levels of contribution to the club, which for some included the pleasure associated with teaching. This feeling of enjoyment further motivated people to persist with their TC practice.

> *"I do enjoy doing it. There is so much depth and personal enjoyment to the Taoist TC, and it is certainly ongoing with benefits to my well-being" Respondent 97*
>
> *"I do enjoy TC more than I thought I would…I am looking forward to becoming more involved with the club in the future" Respondent 25*
>
> *"Very enjoyable exercise that I could manage (I have six joint replacement, so not always easy)" Respondent 37*
>
> *"I enjoy my classes as people are all friendly and I feel good when I have friends" Respondent 219*
>
> *"Enjoying the silence while practicing" Respondent 297*
>
> *"Working [practising TC] in harmony with others, doing the set is a key element of the enjoyment" Respondent 257*
>
> *"Enjoyment on teaching and seeing beginners completing the set" Respondent 115*
>
> *"Enjoyment of teaching beginners classes—giving back something for all the benefits others have given to me through teaching TC" Respondent 92*

Improved self-confidence related to improved physical abilities was also reported by some of the participants as reflecting positively on daily life activities, such as gardening, walking, traveling and work-related performance. In addition, some noted that the achievement associated with eventually being able to master the whole 108 TC set, boosted their confidence significantly. Interestingly, some

participants also reported an increase in confidence related to undertaking volunteer positions, such as instructing and administrative roles.

> *"I could practise the 108 set. [I] never thought I could do it before- [lack of] confidence" Respondent 70*
>
> *"Proving to myself that I can learn a technique that is complex which requires constant improving through practice" Respondent 24*
>
> *"I feel confidence when moving in the garden & on my morning walks" Respondent 65*
>
> *"With constant practice of TC I can travel with confidence" Respondent 341*
>
> *"The fact that I have confidence to stand up and speak publicly was definitely an unexpected bonus" Respondent 33*
>
> *"I have maintained and strengthened my legs and body. When with my own age group I can see the difference in body movements & strength. It's not what I am; it's what I might be if had not done TC" Respondent 332*

Learning TC, particularly remembering the 108 TC movements, was a significant challenge for the participants at the early stages of learning TC. The effort associated with mastering this challenge and then, for some, to then go onto instructing others, resulted in a great sense of self achievement and self-confirmation. This success also encouraged some to overcome other difficulties encountered in life.

> *"My first unexpected [benefit] was the feeling that if could learn 108 moves and remember them, I could do anything! This helped me at work as I was about to computerise the school library and I was new to computers. It worked too --I can still pull that feeling up when needed!" Respondent 38*
>
> *"Then sense of achievement! Learning the 108 moves and being able to perform a 'set' at will was a good feeling" Respondent 54*
>
> *"A sense of achievement, especially being able to instruct beginners& help others to learn TC" Respondent 11*

Participating in TC also prompted some participants to contemplate their attitudes towards life and others. This introspection was reported as resulting in a more tolerant and positive outlook to life and an acceptance of themselves and others.

"I am more tolerant & less critical" Respondent 309

"Socially & emotionally I feel more balance, more understanding of the need of others and more supportive of others" Respondent 326

"Showing up my tendencies to be controlling from [or] of critical of how others may be practicing a particular move of Taoist TC -so that I can modify my behaviour" Respondent 224

"Something happens to your spirit when you make the commitment to do TC --you learn it is not about you doing the moves; it is about being connected to the "all" of the universe community. They should teach it in primary school's as part of PE" Respondent 358

The TC society encourages a wide range of volunteer activities amongst its members. Some participants valued this opportunity and perceived it as a chance to help others and contribute to the TC community in return for benefits they themselves had personally received.

"The opportunity to give and help others" Respondent 192

"Have a tangible way to help other people maintain their well-being" Respondent 315

"Feel I can contribute in a charitable way to the world" Respondent 130

"As an instructor, I have been given wonderful opportunities to help others by sharing Taoist TC with them" Respondent 316

Other unanticipated benefits mentioned by participants also included the acquisition of new skills, such as public speaking, management skills and even negotiation skills as a result of volunteering, which they were also able to use in their everyday life.

"Improved public speaking skills and learning how to negotiate commercial lease" Respondent 202

"[I have learnt] leadership skills; management skills; and public speaking skills" Respondent 59

6.3.3 Improved social life

Physical activity not only provided physical and psychological benefits, but also facilitated social contact between individuals, often offering an opportunity to build social networks and improve social life. These improvements were most often expressed in terms of their friendship with other club members and instructors and their experiences as being part of belonging to the Society. Many participants reported that TC practice provided a platform to share experiences with both friends and family members, make new friends, and gain access to extra support and encouragement when they were in need of personal assistance. For many this was a vehicle for meeting the needs associated with belonging to a social network and led to a reduced a sense of isolation and loneliness. This social benefit, in turn, played a crucial role in the sustainability of their TC practice. It was interesting to note that many people felt the benefits related to an improved social life had not been anticipated when they had first commenced TC.

Many participants felt TC had added a new dimension to their social life where they could make new friends from different backgrounds and with whom they were able to share their TC and other life experiences. Their common interest in TC helped them to build a new and supportive social network where TC instructors and TC members supported and encouraged one another in need, resulting in a positive sense of belonging and community

> *"Joining a group, a society, with more than TC class, meeting other people with a common interest" Respondent 26*

"Social network-a good friendship with fellow TC [people] from initial beginners' class--we still attend continuing groups together" Respondent 50

"Being part of an organization that cared about its members and the broader community felt good" Respondent 164

"I have been warmly welcomed into an international community that is the Taoist TC society, and now plan my travel to visit TC classes [in other countries] as an instructor" Respondent 309

This increase in interpersonal contacts not only occurred amongst TC group members, but also between family members. Some participants encouraged their family members to join the TC club resulting in an increase in family connectedness.

"Shared interest and activity with my wife and meeting very nice, supportive and encouraging fellow practitioners" Respondent 44

"I can have a responsive partnership with my husband. I have new and respectful friends at our TC club" Respondent 341

The environment provided by the TC club was also considered an important aspect of their feeling socially accepted and played a significant role in their TC practice, allowing them to learn and practice TC on their own terms without pressure. The supportive environment and perceived lack of competition enhanced this experience and facilitated a positive learning process, thus motivating them to continue their TC practice.

"Happy disposition of participants in class (like one happy family); Being involved with group activity: no peer pressure - able to perform at the best of individual ability"343

"It's a lovely family of friends & no competition, just for benefit & health to do it" Respondent 190

"To have met such a vast range of people & be accepted in a nonjudgmental & non competitive way who treat you as "family" has been a privilege to experience" Respondent 326

"Receiving support and encouragement from my instructor and other members of the group" Respondent 261

'The instructors are personable and friendly and also reassuring that we will eventually get there" Respondent 25

"Really appreciate the gentle, caring, unassuming nature and manner of the beginner and continuing instructors. That is why I attend four times per week whenever possible" Respondent 193

In addition, a few of the participants received extra emotional support from instructors and other members to help overcome personal hardship and difficulties.

"Emotional support during and after cancer treatment" Respondent 260

"Helped go through loss of husband, cancer treatment and fracture of leg" Respondent 12

"Just having experienced loss of loved ones; the strength and the caring of the TC members have been unreal. I can go alone to a class if I want to just be there and not participate; that is fine. There are times when the needs of members are required - a chat in a circle and a green tea - work well" Respondent 332

In summary, the participants perceived a variety of physical, psychological and social benefits from participating in TC practice and belonging to a TC club. Some benefits, for some, even surpassed their initial expectations. The benefits reported were mainly related to improved physical functioning and general health and well-being, in addition to increased relaxation and social networks and support. These perceived benefits, to a large extent, were consistent with the expectations that respondents held prior to initiating TC. However, the improvement relating to the attributes of self-esteem, increased spirituality and a more active and positive social life had not been anticipated by many participants. Noticeably, these benefits were not only reflected in their accomplishments in regard to TC practice but were transferable into their abilities to manage everyday activities. This served as a positive reinforcing factor that, in turn, further motivated them to persist with their TC practice. However,

like any physical activity, some participants did encounter difficulties with, and barriers to, TC practice. Perceived barriers to TC practice are presented in the following section.

6.4 Perceived Barriers to Tai Chi Practice

Although most of the qualitative comments received from the study participants related to the benefits of TC, as with all human activities, there were a variety of challenges that confronted respondents, which might discourage them from persisting with TC practice. However, responses to this question, and consequently the frequency of coded elements for each theme were considerably lower in number compared to the perceived benefits, as can been seen in Figure 6.9. The responses (N = 251) provided in-depth descriptive answers that could be categorized under two major themes that related to the effects of either external [club and environment] or internal [personal] factors.

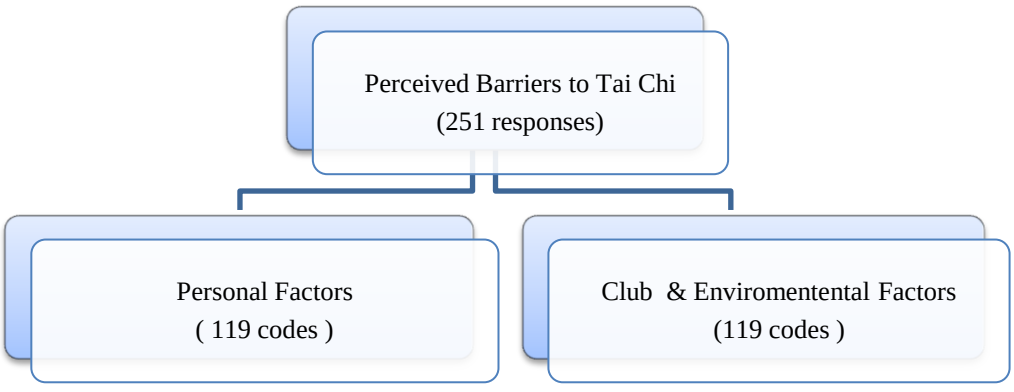

Figure 6.9. Thematic structure of perceived barriers to Tai Chi (N = 251)

Analysis of the coded elements revealed three subthemes across the theme of personal factors, and these were personal negative perceptions, physical limitations and a busy life. Whereas club and environmental factors were identified as being associated with administrative factors, perceived pressures and teaching strategies, as can be seen in Figure 6.11, with the categories identified. Moreover, each category emerged within this question is visualized with their numeral representations in Figure 6.10. Interestingly lack of self-confidence was the most commonly cited obstacle to undertaking TC (n = 44).

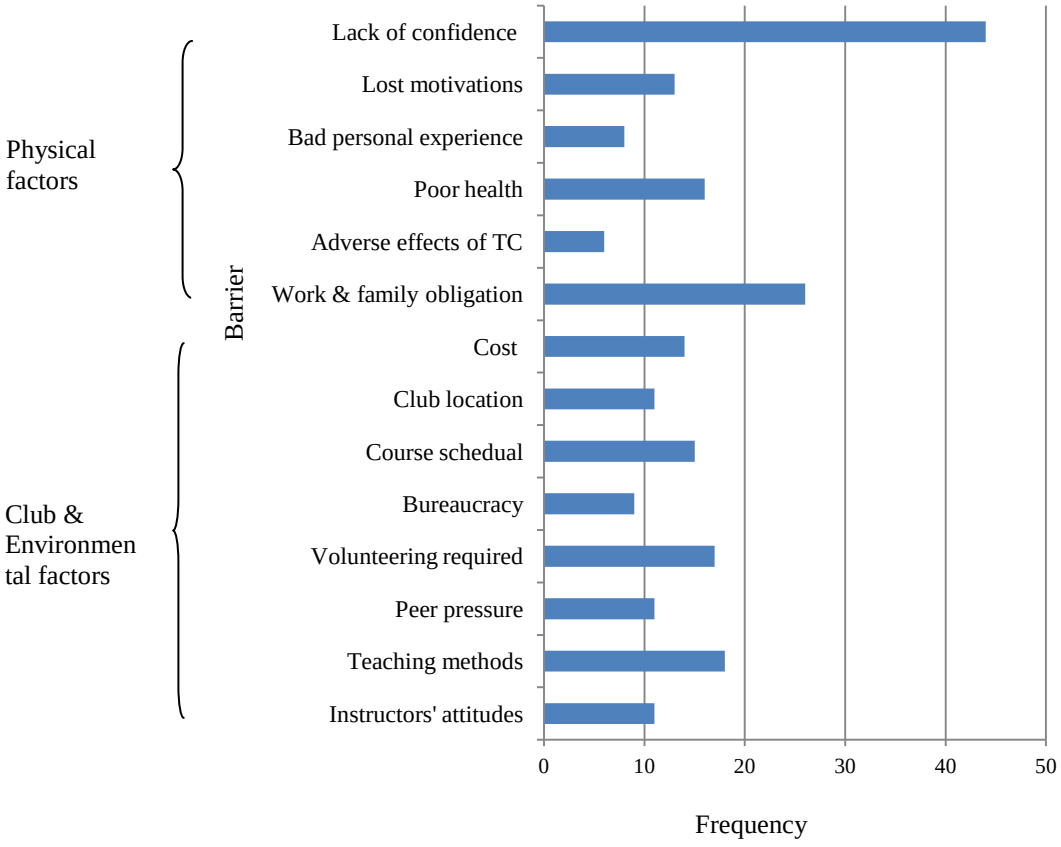

Figure 6.10. Frequency of responses in each of the categories related to perceived barriers to Tai Chi

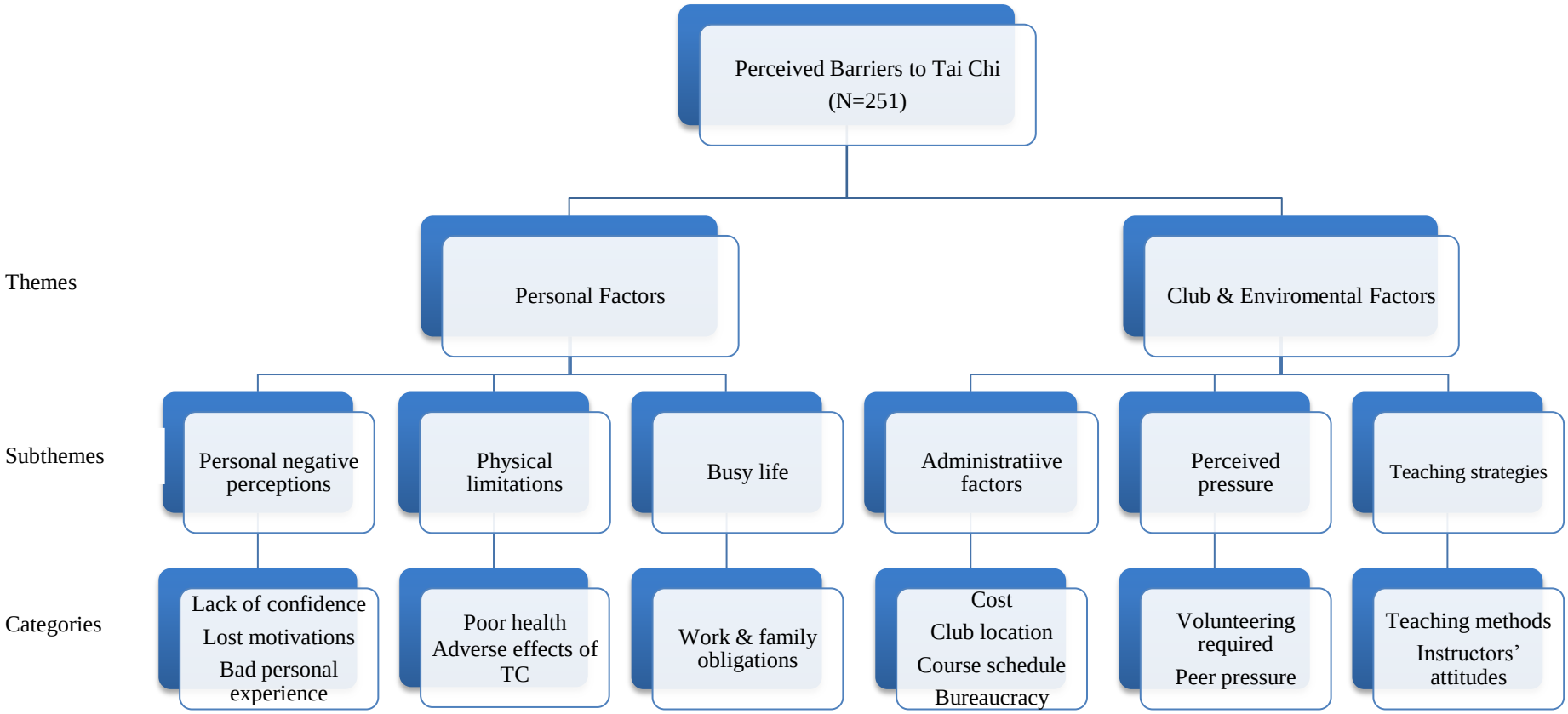

Figure6.11. Themes, subthemes and categories for responses to the question "Please describe anything which may have discouraged you from doing Tai Chi"

6.4.1 Personal barriers to practising Tai Chi

There were a number of personal factors that participants felt were barriers to their TC practice. These factors were mainly related to their negative experiences associated with TC practice. In addition, it was also associated with their physical conditions, such as illnesses or tiredness, and their busy lifestyle due to family or work obligations.

6.4.1.1 Barrier to Tai Chi: Personal negative perceptions

Not all experiences described by participants were positive. The most commonly reported barrier to practise TC was related to a lack of confidence. Some participants, particularly those who were older, found learning TC was not as easy as they initially thought it would be, especially in regard to having to remember the whole TC set with 108 movements. Some also felt the TC moves were complicated and difficult to follow, resulting in feelings of frustration and some discouragement. This feeling was exacerbated when they saw others who had started TC as the same stage acquiring the skills required more quickly. These difficulties, apparently encountered at the early stage of learning TC, appeared to impact adversely on their attitudes towards themselves and TC.

> *"I found it difficult to remember the sequence of moves. This became stressful" Respondent 118*
>
> *"Sometimes I get a little bit discouraged when I get the TC sequences wrong. When your teacher shows you it does look so easy, flowing and simple, until you try to repeat it" Respondent 30*
>
> *"Difficulty in remembering all the movements - the resulting disappointment, despite the excellent tuition and help from other students" Respondent 109*

"Becoming disheartened when feeling like I was not progressing as I would have liked" Respondent 79

However, some were able to overcome these early difficulties with support from either instructors or other TC members, accepting that progress might not always be immediate.

"It is quite difficult to remember all the moves--you have to let go of the idea of being perfect & remembering everything!" Respondent 83

"Initially only my lack of confidence in being able to perform the exercises which was soon overcame by others friendly encouragement" Respondent 200

"Sometimes the improvements are so small it can be discouraging. The aim is to not keep looking for average but to keep reminding myself what made me start in the first place. Change can be slow but it is always rebuilding our health" Respondent 382

Other participants reported gradually losing their interest in TC due to what they perceived as either the repetitive nature of the TC movements or lack of individual motivation. This loss eventually led some to give up TC.

"The teaching is very slow & often boring" Respondent 69

"Repetition of some moves week after week" Respondent 345

"Only my own [reason] -- lack of motivation. It is very reasonably priced, easily accessible and welcoming" Respondent 164

Only a small number of participants reported their negative experiences related to their interactions with other TC practitioners at the TC club.

"I have experienced two disappointments one personal and one regarding another member" Respondent 115

"There is like an inner circle of people who can seem quite snobbish" Respondent 270

"I have not been able to make friends or click with anyone except the 2 instructors" Respondent 277

6.4.1.2 Barrier to Tai Chi: Physical limitations

Existing health conditions were noted by only a very small number as a barrier adversely affecting their physical function and consequently their ability to do TC.

> *"I have had two hip replacements and just prior to the operations, I had to give up TC as the exercise [was] too painful" Respondent 283*

> *"My illness/chemotherapy side effects" Respondent 62*

> *"I found physical problems. My ankle tendon became extremely sore and the arthritis in my knees worsened" Respondent 118*

In addition to the impact of the participants' original diseases, some participants, however, believed their symptoms were aggravated or caused by poor body posture or performing the moves incorrectly during TC.

> *"Very sore knees and back [on right side] from class before [and it] lasts and [is] still not right. I must have not had feet in correct place and continued so twisted it all" Respondent 26*

> *"Sore knees-I have learnt now how to avoid that and neck/shoulder--headache the next morning after an exercise TC" Respondent 38*

> *"I do find that some of the exercises detrimental to my already aching shoulders" Respondent 233*

> *"I have developed painful knee, which, if it continues, may cause me to initially take a break from TC when next clubs are due, [and] I maybe stop together. The physiotherapist told me that whilst back problems after [TC] improve with TC, knees after [TC] get worse. It is impossible to effectively do TC with painful knees" Respondent 136*

6.4.1.3 Barrier to Tai Chi: A busy life

The fast pace of modern life also became an obstacle for some people continuing their TC practice. Some participants complained their busy family and work commitments, made it difficult to attend TC sessions due to either time limitations or physical exhaustion after long work hours.

"Finding the time can be a challenge in a busy life with competing commitments such as family, work" Respondent 316

"Times available tended to clash with home duties (putting kids to bed etc.) or work (Saturday morning& during the day on weekdays)" Respondent 54

"The speed of life makes fitting in TC challenging" Respondent 1

"Too tired after work, lack of energy (physical)" Respondent 177

6.4.2 Club and environmental barriers

Apart from personal factors, factors associated with the club or the environment were another crucial aspect affecting the participants in their ability to maintain their TC practice. This subtheme consisted of administrative factors, peer pressure and teaching strategies.

6.4.2.1 Barriers to Tai Chi: Administrative factors

Administrative factors influenced the participants in a number of different ways, one of which was the cost related to membership and workshops. Although the Society is characterized as a non-profit organization, membership fees are still charged to cover administrative costs. Moreover, there are added costs associated with members who attend either international or national workshops which is a requirement for volunteer instructors. This cost was perceived as a burden to some.

"If it was expensive" Respondent 32

"Considering all instructors work for no remuneration I feel the fees are high, especially for people like myself who can only attend for short periods of time" Respondent 317

"Workshops are costly, especially international 5-day one in Perth - nearly prohibitive" Respondent 73

Additionally, course timetable and the location of the club were also a problem to some participants. Despite TC classes being offered at a wide range of times over most days of the week, some still found the timetable for classes unsuitable to their needs, whilst others were hindered not so much by the timing of classes but by the length of class.

> *"Fremantle class times in evening too late for people doing F/time work in city. [I] feel rude when leaving during the break because I need to eat" Respondent 358*

> *"Unavailability of class as I do not do TC at home" Respondent 350*

> *"The 1.5 hrs sessions sometimes feel a bit long. Scheduling a couple of "chat and duty" sessions each week might be interesting" Respondent 354*

> *"The 1.5 hrs continuing sessions are too long for me. It was better when they were one hour. I usually attend for 30-45 minutes" Respondent 317*

Others felt the ability to access TC clubs was a perceived barrier.

> *"No TC in my area - had to travel over 40km to get to classes" Respondent 333*

> *"If the location had of been a great distance from my home" Respondent 258*

A bureaucratic feel to the management of the Society was perceived as an obstacle by a few respondents. Compared to the characteristics of previous management, some participants felt the current one was somewhat lacking in democracy.

> *"….intolerance by some of the senior (not by age) members toward people who have different "non-Taoist" idea or suggestions. The Society is becoming very bureaucratic and more like a corporation than the friendly "club "it was 5 or 6 years ago" Respondent 39*

> *"At times it can seem a bit bureaucratic and distortional from the top down but this goes with the increasing age of the Society and need to keep teaching standards high" Respondent 92*

6.4.2.2 Barriers to Tai Chi: Perceived pressures

In the TTCS, TC members were normally required to take a volunteer position to help the organization or to attend social events. Although voluntary work and social

functions are needed for any non-profit organization to succeed, and are also clearly key to the social aspect of the clubs, some participants (n = 19), who were generally young female adults with work obligations, were more likely to feel the expectations from the Society could be too high in this regard, resulting in a feeling of overload. This feeling eventually became a kind of invisible pressure discouraging a few people from further TC practice.

> *"[It is] constant gentle pressure to join in social activities running the club. I want to do TC, not socialize" Respondent 9*

> *"The organization can be a bit rigid and it sometimes has very high expectation of its volunteers in their roles in the Society" Respondent 362*

Another form of pressure noted by a small number of respondents was that related to peer pressure.

> *"I enjoyed beginners classes and doing the set in continuing but the exercises were "too" hard and I felt peer pressure to do them even though it was too difficult and easy to hurt yourself" Respondent 351*

> *"[I was] being made to feel inferior when having trouble doing "sticky hands" by one lady. However, generally everyone else has been encouraging" Respondent 320*

6.4.2.3 Barriers to Tai Chi: Teaching strategies

The teaching role taken by volunteer instructors is an integral part of TC learning in the Society. The instructors' attitudes and teaching strategies were reported by some participants as being important in influencing how they felt about a certain class. However, differing views were held as to the preferred attributes of teachers and methods of teaching.

> *"If instructors and colleagues had not been so encouraging and supportive, I think I would have dropped out" Respondent 290*

> *"Attitude/ behaviour of the teacher - one won't have any conversation in her class" Respondent 14*

"Strict adherence to what we should be doing by instructors rather than what best suits class and not enough instruction on form" Respondent 18

"I choose the instructors that I feel are more skilled to teach. Some instructors though well-meaning, simply talk too much. This cuts through concentration levels for which I am attempting to reach. One instructor in particular treats the fellow class members like grade 3 students, that is a real turn off" Respondent 24

"Sometimes instructors [were] very serious, teaching the traditional way by not talking much [but] by [encouraging] observing older instructors. The beginners prefer newer instructors [who use a] blend of verbal and observation instruction and assistance if unable to get it. XXX [Instructor' name] and XXX [Instructor' name] style of teaching better. XXX [Instructor' name] style and leadership in beginners class was friendly, relaxed, and I could laugh at myself in class when movement was performed wrong and XXX would correct my movement. He made learning fun" Respondent 277

"It is not easy to learn at the beginning and I do think they sometimes progress is a little too fast at times for some people to keep pace, especially with learning the entire 108 moves. Also when you to go onto the continuing classes you are expected to know the 108 moves in sequence [I still have not mastered that] and they don't ever go through it [again] bit by bit" Respondent 137

Overall, during TC practice a small proportion of the study's participants encountered difficulties that impeded their sustained TC practice. These barriers could be divided into internal factors, such as individual health status, personal perceptions, and insufficient time due to their busy life, and external factors in the form of administrative barriers, pressures perceived within the Society and instructors' attitudes and teaching approaches. Some of these barriers were overcome successfully by the participants themselves, with the support and encouragement from both the instructors and other members, while others were unable to do so.

6.5 Conclusion

The findings presented in this chapter have provided a full description of TC practitioners' expectations of TC and their perceptions of TC's effects on their health

and life, as well as the barriers they perceived in undertaking TC. The benefits they perceived, to a large extent, satisfied their initial expectations, which primarily were related to physical and mental health, although the most unanticipated benefits as a result of TC practice were associated with their social life, spirituality and the improvements associated with self-esteem. However, apart from the benefits received, some participants also encountered challenges, either of a personal nature or related to the club and their environment. These barriers, to a certain degree, could pose a negative impact on the sustainability of TC practice over a long period. The following chapter will draw on both the quantitative and qualitative findings of this study to propose a model for TC practice within the context of social learning theory.

CHAPTER 7 TAOIST TAI CHI AS A GLOBAL HEALTH BEHAVIOUR

The Social Learning Theory (SLT), developed by Bandura (1977), has provided an ideal framework in which to address this study's research questions. The combination of quantitative and qualitative data revealed there were a number of determinants that influenced the participants in their initiation, adoption, patterns of use and maintenance of Taoist Tai Chi™ (TTC) as a form of exercise. Their experiences and perceptions indicated that TC was more than just an exercise activity and that for many it represented a global health behaviour. In this context, global refers to the broad reaching effects TC had on the physical, psychological, social and spiritual components of practitioners' lives, rather than from a world-wide perspective.

The findings from this study have shown that practising TTC within the Taoist Tai Chi™ Society (TTCS), is more than just an exercise; it is a health behaviour that results in a wide range of benefits inclusive of physical and mental health and well-being, and social life. Consistent with the review of the literature, where experimental studies have been able to illustrate the positive effects of TC on a variety of health conditions, this study supports these findings from individual TTC practitioner's experiences of undertaking TC within the TTCS' setting. These perceptions not only assisted the participants with chronic illness management across a wide range of disorders, but also improved general health and well-being. This is evidenced by significant improvement in self-assessed general health status, in addition to self-perceived improvements in individual aspects of their lives related to physical

functioning, such as balance, flexibility and muscle strength, and the ability to undertake everyday activities. Increased ability to relax and better mental functioning in relation to improved sleeping, concentration and memory also contributed to physical and mental health and well-being.

Tai Chi is frequently reported as a 'natural' means to learn how to relax and reduce stress. This was also supported by the qualitative data from this study from those who reported living with anxiety and depression. This group reported a perceived decline in anxiety and stress levels, a better quality sleep, an increased confidence in themselves and a more positive outlook on life. This is consistent with findings from previously undertaken quantitative studies (Wang et al., 2009; Sandlund & Norlander, 2000; Tsai et al., 2003), where significantly lower anxiety and stress levels and improved relaxation after TC interventions were reported using data gathered from psychometric instruments, such as the State-Trait Anxiety Inventory.

In addition to the reported physical and mental health benefits, TC also facilitated increased social integration and interaction by enlarging the participant's social and support networks. Social life in the TTCS not only provided additional support systems in addition to physical activity, but through the volunteering experience, people were able to gain a feeling of being helpful, useful and valuable, which also contributed to their general health and well-being. This was of particular importance for those who were elderly, retired and living with chronic conditions.

Perceptions reported by TC practitioners in this study, in combination with experimental findings provided by other studies, indicate that TC is a form of activity

closely linked with better health and well-being across the physical, psychological, social spectrum, and even encompasses spiritual health.

Health behaviours have been defined as "any activity undertaken for the purpose of preventing or detecting disease or for improving health and well-being" (Conner & Norman, 2005, p. 2). In consideration of this and the wide-ranging effects associated with TC, this study indicates that TC is a global health behaviour providing an holistic approach for improving health and well-being that is suitable across varying age ranges. It seems especially suited to the needs of older adults with chronic conditions.

When considering these findings within Bandura's (1977) SLT, where behavioural change is determined by multiple variables, such as one's expectancy and subsequent reinforcing factors, this study found TC also involved complex intertwined processes of intention, adoption, initiation, practice and adherence. During this process, individual socio-demographic characteristics, beliefs related to health locus of control, the efficacy of TC and personal outcome expectancies, in addition to the interaction with other TC members and exercise environment, all impacted on continued TC practice. When applying Bandura's SLT to this current study's findings, a Tai Chi Health Behaviour Model was generated, depicting how TTC practitioners change their behaviour through TC practice in order to achieve a holistic (global) health status (Figure 7.1). This model begins with a continuum of determinants that stimulate people to form an intention to undertake TC and is completed by a virtuous cycle where the maintenance of TC practice occurs under the effect of a range of reinforcing factors. This model reflects the interplay of person, environment and health behaviour throughout TC practice (see Figure 7.1).

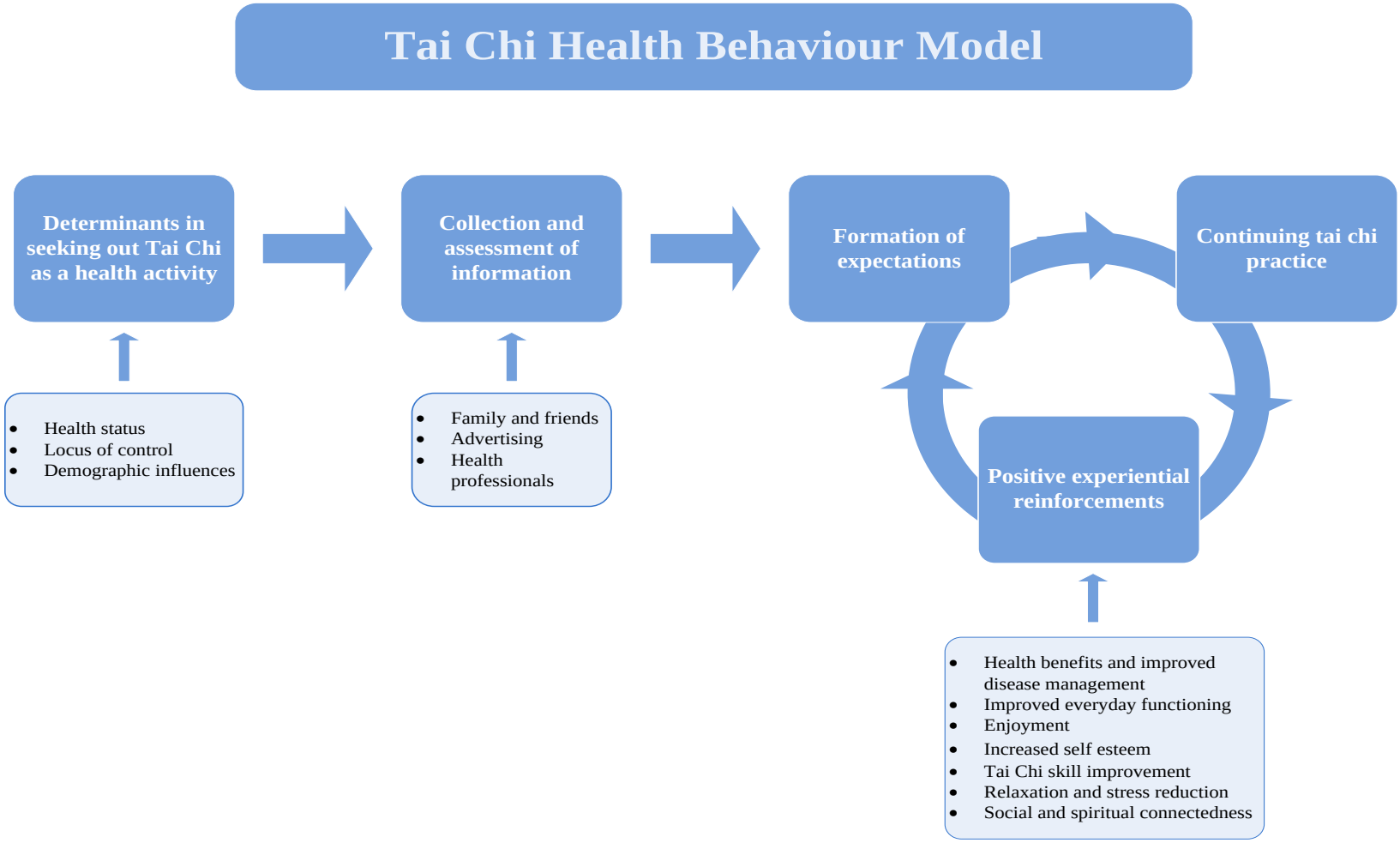

Figure 7.1. Tai Chi Health Behaviour Model

As described by Bandura (1977), "behaviour, other personal factors, and environmental factors all operate as interlocking determinants of each other" (p. 9). In this current study, age, gender, employment status, health status, locus of health beliefs and TC efficacy were all identified as key determinants in TC practice. When an older individual, for example, perceived age-related deterioration in balance and flexibility, this perception was his or her potential impetus to seek physical exercise in order to maintain, restore or improve their current level of body functioning. Through a cognitive process, such as information collection and assessment about the possibilities provided by TC practice, people were able to make their own decisions as to whether they would like to be involved in TC as an exercise in accordance with their individual situation. Once desirable outcomes, such as improved physical and mental health, were received, or reinforcing factors, such as enjoyment, improved TC skills and competence or social reward, were experienced, TC practice as a health behaviour was more likely to be retained and maintained, as portrayed by the cycle displayed in the TC Health Behaviour Model (Figure 7.1). This is in line with SLT (Bandura, 1977) where an individual's behaviour is extensively regulated by its consequences. However, it should be realized, although the cycle begins with TC as the action being undertaken, the action may end at any point of the model. Any number of variables may intervene at any stage along the continuum of initiation, and the cycle of continuing practice that results in the cessation of TC. This is a core issue related to TC adherence and indicates this model can be used to guide the promotion of TC as a health strategy in health promotion. The

model may also be useful in assisting to highlight factors that might either stimulate or impede exercise adherence in other forms of physical exercise and activity.

Overall, from intention and initiation to continued growth and maintenance of TC practice, there is "a continuous reciprocal interaction of personal and environmental determinants" (Bandura, 1997, p. 11). Through discussion of these interactions, as occurs in the following chapter, we can examine the importance of TC in improving and promoting health in people's lives and how TC can be further promoted to achieve this end.

CHAPTER 8 DISCUSSION, IMPLICATIONS, LIMITATIONS AND DIRECTIONS

8.1 Introduction

This chapter discusses the study's findings in the context of the Tai Chi (TC) Health Behaviour Model presented in the previous chapter. It begins by examining the implications associated with the demographic characteristics of TC practitioners from the Western Australian (WA) Taoist Tai Chi™ Society (TTCS) and their patterns of TC practice, which for practitioners outside of China is reported here for the first time. Then it explores the factors either motivating or impeding people to undertake TC and its impact upon TC initiation, adoption, practice and maintenance by comparing these findings with past research in a range of related disciplines. The findings that support published research around the positive effects of TC on health and well-being particularly amongst those with chronic illness are also discussed, in addition to new findings related to an increase in the attributes of self-esteem as a result of practising TC. Risk management issues related to TC practice that were raised in the context of this study are also highlighted. The results of this study are relevant for researchers, TC Association organisers and health promotion planners. Therefore, a series of recommendations are made in relation to TC and its importance in public health, especially in regard to the ageing population.

8.2 Optimal Patterns of Tai Chi Practice

The patterns of TC practised by Taoist Tai Chi™(TTC) practitioners in WA has been for the first time explored and reported in this study and can be confidently generalised to include all Australian TTC practitioners. This is due to the nature of sampling undertaken from all clubs in rural, regional and metropolitan WA, along with the consistent club structures and TC content taught throughout Australia. Since there were no published studies found specifically exploring the patterns of TC practice in Western countries, it is of interest to compare this current study's findings with the patterns of TC practice that are reported in the literature relating to China, where TC has its origins.

Compared to the patterns of TC practice in China (Yang, 2004), this current study revealed the frequency of TC practice in Australian TTC practitioners as once or twice per week, which is far less than that in China where TC is normally practised more than five times per week (Yang, 2004). However, the duration of practice sessions was longer for Australians than the Chinese, at 60-90 minutes versus 30-60 minutes, respectively, per single session (Yang, 2004). The disparity in the frequency and duration of TC practice between Australia and China could be considered a necessary adjustment and modification in accordance with varying cultural demands. The decreased frequency of practice in Australia may be offset by the increased duration of practice sessions that occurs.

Another consideration relates to the form of TC practised. In Yang's (2004) report from a study conducted in the Jiaozhuo area of China, the Cheng-style TC

remains the most popular form practised with a 53% prevalence rate. Although the number of TC movements in the form of Cheng TC being practised is not reported, Master Han Jin-Song, a Tai Chi expert, reports that the new Cheng-style TC is commonly practised with either 19, 38 or 83 movements (J.S. Han, personal communication, August 29, 2012). The newer Cheng styles, however, all have fewer movements than the 108 Yang Style of TC practised by TTCS members in this current study

Tai Chi is generally sought out as a mind-body exercise and requires a high level of concentration combined with a relatively slow speed of movements. This is a key to facilitating states of both physical and psychological relaxation. However, time spent to complete a TC set is dependent on the form practised. For instance, the 24-Form TC has an estimated completion time of approximately five minutes and the 48-Form TC, 8 minutes ("Simplified Tai Chi Quan," n.d.), whereas the 108 Yang Style of TC practised in this study requires approximately 12 to 15 minutes to complete (T. Fetherston, personal communication, September 20, 2012). In relation to this there is no current published data on which is the most beneficial pattern of TC practice. In TC-related clinical studies, it has been common to employ a short version of TC over a short time frame as the TC study intervention (Kutner, Barnhart, Wolf, McNeely, & Xu, 1997; Li, Harmer, McAuley, Fisher, Duncan, & Duncan, 2001; Yeh et al., 2004; Audette et al., 2006; Sprod et al., 2012). For example, a systematic review (Lee, Lee, & Ernst, 2009) examined the effectiveness of TC on improving aerobic capacity and found the studies reviewed usually employed a 5 to15 movement TC style with a duration of practice ranging from 45 to 60 minutes, two or three times per week for only 12 or 14 weeks.

The authors concluded in relation to this that "the existing evidence does not suggest that regular TC is an effective way of increasing aerobic capacity" (p. 569). This is despite one study that has shown a direct relationship between TC style and oxygen consumption where a TC practitioner who practises the classic 108 Yang Style of TC (akin to that practised in this current study) will consume more energy, as measured by maximum oxygen consumption (VO_2max), than those practising a more simplified form and that long-term TC practice is effective in improving aerobic capacity (Taylor-Piliae & Froelicher 2004; Taylor-Piliae, 2008). It seems that duration is an important factor in raising aerobic capacity in TC. The style of TC, frequency, exercise intensity and number of years practised may have considerable influence on the final interpretation of outcomes from practising TC. In consideration of this, and with the average of over 6 years of TC practice amongst the TTC practitioners who practised the 108 Yang-style TC in this current study, it is not surprising to find the increased health benefits as described by participants are similar to those also reported in clinical trials. This is especially so within the TTCS as TC is also practised in continuing classes combination with complementary TC exercises and intensive periods of practice of selected moves from within the set.

Duration of TC practice is, however, not always seen as an over-riding issue in relation to potential benefits. For instance, Hong (2011) suggests TC practice should emphasize the "quality" rather than the "quantity" and that practising well for 20 minutes a day is more desirable than an hour of exercise where TC may be performed incorrectly. There is currently no recommended guideline for the length of TC practice. According to exercise guidelines (Murray, Zentner, & Yakimo, 2009), either aerobic or

recreational exercise 3-5 times a week for at least 30 minutes is recommended for increasing flexibility and strength in adults, whilst Arthritis Australia recommends 30 minutes of TC practice on most days ("Arthritis Information Sheet: Tai chi," n.d.). In consideration of qualitative data received from respondents in this current study, where a 1.5 hour session was considered too long by some, flexible group sessions ranging from 30 to 60 minutes per session three times per week may be more suitable for seniors, those with health conditions and those with full- time work and family obligations. However, from an individual's health perspective, a frequency of TC practice of 30 minutes for at least five days per week would be recommended, if this was their sole source of exercise in order to maximise health outcomes.

8.3 Factors Influencing Initiation and Adherence of Taoist Tai Chi™

8.3.1 Personal characteristics influencing Tai Chi participation

One of the main aims of this study was to describe the characteristics of TTC practitioners in WA. The data revealed that the majority were older or elderly Australians with a Caucasian background, female, retired, well-educated, suffering with at least one chronic illness and living in metropolitan areas. The average age was 61 years. However, there was a broad age range, from 14 to 88 years of age. These characteristics are similar to the TC practitioners described in a United States study (Birdee, Wayne, Davis, Phillips, & Yeh, 2009), in as much as they were also more likely to be female, with a wide age-range and living with chronic health conditions. Similarly a more recent Chinese study (Birdee, et al., 2013), also described TC

practitioners as female, older, more educated, and retired, with chronic medical conditions.

The predominant proportion of women undertaking TC may be in part explained by their preference for forms of exercise characterised by strength and balance training, such as yoga, rather than more vigorous types of exercise, which are generally preferred by men (Roper, 2002). The Yang-style TC is composed of slow and gentle movements and was developed from the Cheng-style, the original form of TC predominantly practised by men in China as a form of self-defence. However, vigorous movements, such as Fa-jing (release of power), jumping, stamping, and other abrupt actions have been removed (Rodell, 1991). This has resulted in the gentler, smoother movements that characterize the Yang-style TC and are seen in the form practised in the TTCS, which also appears to be attractive to women and older people. This trend is also now seen in modern China. For example, in Jiaozuo where the Cheng-style TC is commonly practised, the proportion of male TC practitioners has been observed to be higher than females by nearly 20% (Yang, 2004). Whilst in Shanghai, where the prominent forms are either the 24 or 48-Form TC, which are simplified from the classic Yang-style TC, there are twice as many female TC practitioners than males (Li, el at., 2003). Another factor that may contribute to the higher proportion of women practising TC in Western cultures, such as in this study, may relate to their working life. In Australia in 2011, for instance, nearly three in four part-time workers were women (Australian Bureau of Statistics, 2011a), which provides them the flexibility to engage and commit to a physical exercise, such as TC.

In addition to the high proportion of women amongst TTC practitioners, of note was the high prevalence of reported health conditions. Over three quarters of respondents reported they were either suffering, or had once suffered at commencement of TC, one or more chronic diseases, with 4% reporting as many as five or more. Musculoskeletal disorders (MSDs, 45%) and cardiovascular diseases (CVDs, 43%) were the most commonly reported health conditions, with a reported prevalence for arthritis of 31% and 28% for hypertension. The latter two are twice and three times more, respectively, than the prevalence rates reported in the general population where only 15% of Australians were affected by arthritis and 9% by hypertension (Australian Bureau of Statistics, 2009). Mental health issues also had an increased prevalence among TC participants, with nearly one quarter of participants reporting conditions, such as anxiety and depression, compared to 11% reported in the general population (Australian Bureau of Statistics, 2009).

The high rate of chronic conditions observed in comparison to the general population does indicate that TC is sought out as a source of exercise for those with chronic illnesses. This is, however, in contrast to the common belief that poor health is the leading barrier for people engaging in physical exercise or activity. Indeed, the increased prevalence of both physical and mental health conditions reported in this current study seems to be a motivating factor for seeking TC as a form of exercise. This is supported in the qualitative data, where participants indicated that they actively sought out TC as a strategy to assist with their chronic disease management. For instance, they expected TC could assist in the relief of pain caused by arthritis and other musculoskeletal problems, in addition to the alleviation of other symptoms associated

with conditions, such as high blood pressure, joint stiffness, breathing problems, and stress and anxiety. These findings support other studies (Cohen-Mansfield, Marx, & Guralnik, 2003; Nerurkar, Yeh, Davis, Birdee, & Phillips, 2011) that found that medical conditions can be a motivating factor for increasing physical activity and the utilisation of Complementary and Alternative Medicine (CAM), as appears the case in this current study. These expectations may be associated with the promotion of TC as a health activity in both the scholarly literature (Fetherston & Wei, 2011) and the community, where groups, such as Arthritis Australia, recommend TC to people who are of any age and fitness level, and living with arthritis, whilst promoting its benefits in relation to muscle strength, balance, posture, pain relief, flexibility and stress management.

A notable exception in the study's findings related to the prevalence of chronic conditions amongst TC practitioners was people with diabetes, who formed only a very small proportion (5%) of those undertaking TC. This is despite diabetes being one of the more common chronic conditions associated with age and existing studies specifically reporting the potential benefits of TC to people with diabetes (Lam, 1997, 2000; Liu, Miller, Burton, & Brown, 2009). The reason for the observed lack of TC participation amongst those with diabetes in this study is unclear but this does indicate a potential area for development in regard to promoting TC to this section of the community.

This study also reveals that age is an important determinant influencing TC engagement, intentions and adherence as well as attitudes towards TC. In this current study, the high proportion of older and elderly adults amongst the TC practitioners is consistent with other studies (Birdee et al., 2009; Yang, 2004; Lan, Lai & Chen, 2002), showing that TC is most commonly practised by older members of the population. With

ageing, people are confronted with the inevitable and gradual decline of physical functioning, age-related symptoms, such as musculoskeletal pain and a lack of flexibility, increased difficulty in performing daily activities, and a subsequent increase in the incidence of health conditions and chronic disease. Therefore, it is commonly accepted that when people age the type of physical exercise undertaken is adjusted accordingly in regard to exercise intensity, frequency and duration (Ananian, et al., 2006). It is pertinent in these contexts that, as Adler and Roberts (2006) have suggested, "older adults may be more inclined to participate in and maintain an exercise program that does not result in more pain and discomfort" (p. 122). Tai chi's low physical demand, low physical consequences and slow, smooth movements undertaken at the individual's own pace make TC an appropriate, accessible and sustainable exercise for all people, particularly older adults with chronic illness (DiGiacomo et al., 2010). This likely explains, in this current study setting, why people considered TC to be what they commonly called a 'suitable' exercise.

Work status, another important personal factor, also impacted considerably on TC practice and adherence. As expected, with such an older population of participants, approximately half were retirees and only 28% were working full-time. The absence or reduction in work obligations was an enabling factor that allowed many people in this study to participate in TC practice. This is particularly highlighted by the difficulties experienced by full-time employees who commented that work and family commitments, tiredness after work and lack of time considerably restricted their ability to attend TC sessions and persist with their TC practice. One solution that may address this issue is for employers to consider offering the opportunity for employees to

undertake TC practice within the work environment, either immediately prior to work commencement or during allocated breaks. For instance, the Chinese government has incorporated tai chi as one form of physical exercise to be undertaken in the workplace during work breaks (Yuan, 2012).

At present, health issues and sick leave amongst employees have taken on increasing economic and lifestyle importance and has subsequently been highlighted by the government. For example, the Department of Sport and Recreation in WA advocates the provision of a "healthy active workplace", where employees are encouraged to live healthy and active lifestyles (Hooper & Bull, 2009). They recommend increasing opportunities for employees to participate in physical activity through changes to the workplace that support employees in making healthy choices. In this context, TC has considerable potential as a workplace exercise due to its multiple benefits, no equipment requirements and minimal space requirements. In addition there is potential for TC to assist with the relief of work-related stress, which is evidenced by the participants' comments, reporting that TC had helped them to relieve work stress and reduce stress during job change. They also reported becoming calmer as a result of TC practice and their ability to understand and cope with problems and conflicts had been enhanced. Interestingly, TC practice in the workplace has been conducted and is performed in some private companies and public departments in Australia. For example, Tai Chi Australia offers tailor-made TC courses to Telstra, IBM, the Department of Justice, the Department of Education and Training, and the Australian Taxation Office (J.S. Han, personal communication, August 29, 2012). This model could be further extended to include any workplace environment if funding and resources were made available.

8.3.2 Sources of information promoting Tai Chi as a potential exercise

Sources, such as the Arthritis Foundation in America and Australia, recommend TC as an alternative therapeutic option in chronic disease self-management. However, this study found the main information source regarding TC was not from health professionals or health organizations. Rather, it came mainly from either friends and family members or advertising, and played a strong promotional role in TC initiation and adoption. This unanticipated finding is perhaps explained by a lack of awareness by health practitioners of the benefits of CAM therapies, such as TC, and their suitability as adjuncts in chronic illness management. This may be related to the lag time associated with the translation of research findings into practice with most research on the benefits of TC having only taken place in the last two to three decades. Additionally, as TC is viewed as a form of CAM in Western societies (Tracy et al., 2003; Snyder & Lindquist, 2009), it may subsequently not be credited as being effective amongst health care providers. For example, two studies, which were conducted in Australia and Taiwan, found respectively that there were insufficient organisational policies related to the practice of CAM in clinical settings, in addition to a lack of knowledge and education about the potential benefits of CAM amongst nurses (Wallis, Peerson, Young, Parkinson, & Grant, 2004; Chu & Wallis, 2007). Furthermore, an American survey (Tracy et al., 2003) revealed only 36% of critical care nurses in Minneapolis City considered TC to be a legitimate therapy and only 18% reported having some knowledge regarding TC. More than half admitted they did not know enough about TC. This lack of knowledge amongst health professionals represents a significant barrier to

health practitioners referring their clients to TC, particularly as physicians have been reported as feeling less comfortable when discussing an unfamiliar alternative therapy with their clients (Corbin & Shapiro, 2002). However, despite health professionals' lack of knowledge of the applications of a CAM therapy, such as TC, existing research demonstrates that some health care providers do hold positive attitudes towards the use of CAM in clinical settings (Tracy et al., 2003; Wallis, et al., 2004), believing they should be able to provide information and advice about CAM as an adjunct therapy when it is appropriate (Tiralongo & Wallis, 2008a, 2008b). This level of receptiveness creates a positive setting in which to develop CAM-related education and training in Western societies particularly in relation to the benefits of TC.

The opportunities for health practitioners to play a positive role in promoting the health benefits of TC practice are significant. For instance, the high rate of doctor-patient visits provides enormous education and health promotional opportunities. According to a report from the Australian Institute of Health and Welfare (AIHW), there were 95,839 encounters between Australian doctors and patients in 2010-11, in which those aged 45–64 years accounted for 27.7% and those aged 65 years and over, 29.0% (Britt et al., 2011). These interactions between health practitioners and their clients are an ideal pathway for information transmission related to the benefits of TC, especially for those patients living with chronic illness. Furthermore, this doctor-patient form of information transmission is all the more relevant as health professionals are in a privileged position in being able to influence people in undertaking health behaviours. Particularly, as research shows, when doctors provided a prescription to undertake an exercise regime, patients significantly increased their physical activity and this exercise

behaviour lasted longer (Dobson, 2008).

With the rapidly growing incidence of people living with chronic conditions and the associated increase in people looking for an exercise to meet their health needs, it is important that health professionals have knowledge of the potential benefits of TC, particularly in relation to the ageing population and those with chronic illness. This study's findings have shown there is a significant gap in the provision of such information by health professionals.

8.3.3 Environmental influences on Tai Chi practice

Individual behaviour interacts with, and is influenced by, the environment an individual is in, including the psychological environment (Bandura, 1997). This was apparent particularly in the club-based TC practice observed in this study where people who attended TC sessions at their local TTC club practised in excess of twice that of those who exercised alone, at home for instance. This is supported by other studies, reporting that people who exercised in the company of others did so for longer periods than those who exercised alone (Dunton, Berrigan, Ballard-Barbash, Graubard, & Atienza, 2009; Dunton et al., 2012) and that the long-term maintenance of physical activity was significantly enhanced, particularly in older adults (Buman et al., 2011).

The role of the exercise environment in TC practice is further supported by the positive feelings respondents reported regarding being a member of the TTC club. Both quantitative and qualitative data revealed respondents frequently referred to the friendly, supportive, safe and encouraging TC learning and practising environment, with nearly all reporting a feeling of being with friends when at the Society. This perception of

support and connectedness within the TTC club was significantly associated with increased attendance of social events within the Society and TC behaviour. For instance, people who had positive experiences in the exercise environment attended TC sessions and practised TC three times more than those who did not. Others cited new friends made at beginners' classes as an incentive to participate in continuing classes. In addition, the friendly and generally non-competitive, non-pressured environment within the Society also enabled them to learn and practice TC at their own pace with confidence and a feeling of control. As McMurray and Clendon (2011) state, "when the social environment is supportive, creating a climate of trust and mutual respect, a person is more likely to be empowered, in control of their life, and therefore their health"(p. 7). These findings further contribute to research that shows environmental factors and social interactions are positively associated with physical activity in relation to exercise intensity and adherence (Booth, Owen, Bauman, Clavisi, & Leslie, 2000Dunton et al., 2009; Dunton et al., 2012) and also emphasize the importance of the role of social environment in shaping exercise participation and adherence (Giblett, 2008a).

Reports by participants of the importance of the social networks they developed and the community support they received through being a member of the TTCS, raises the potential for TC, as practiced within a culture of belonging and reciprocity, to contribute significantly to the development of social capital. Social capital refers to an accumulation of wealth, but the wealth is "the kind of wealth that draws people together as a cohesive force in a group of trust and mutual respect" (McMurray & Clendon, 2011, p. 14) and is described as being durable in nature (Hawe & Shiell, 2000). Durability has been reflected in this current study by the notably long average period of time study

participants had been practising TC with the Society and equates with the concept that there is also a significant investment of time and effort required to maintain and develop social capital. In addition, Hawe and Shiell (2000) suggest that social capital does not depreciate with use. Instead, as people participate on a community basis and share the same social capital, a sense of cohesiveness, social support and belonging are generated and enhanced, resulting in the further and continuous growth of social capital. Existing literature has investigated the relationship between social capital and health at both an individual and a community level and shown that social capital is significantly associated with positive individual health outcomes (Ziersch, Baum, MacDougall, & Putland, 2005; Giordano & Lindstrom, 2010; Giordano, Björk, & Lindström, 2012; Pieter-Paul & Tampubolon, 2012), which has also been reported in this current study.

Although this study did not purposefully seek to measure social capital as an outcome of TC practice, the findings from both the quantitative and qualitative data indicate the existence and development of social capital within the TTCS, including its positive impact on individual TC behaviours. This was evidenced by participants reporting the benefits they received through developing social networks within the Society and their long-term TC practice and then in turn, being motivated to voluntarily contribute their time, energy and efforts to help others. Within the Society this meant becoming involved in the teaching, administration and other affairs required to support the Society and its aims. Comments from TTC practitioners reflect a lived experience of how they interacted and mutually assisted each other to pursue the aim "To make the Taoist Tai Chi™ internal arts available to all" (Taoist Tai Chi Society of Australia, n.d.), which included the dissemination of TC and TC culture, in addition to the goal of

improving health. Participants described relationships that developed in this process resulted in sensitivity to others' needs and the development of mutual support, particularly in times of personal need. This evidence, in addition to the rapid growth of TTC branches that has occurred across Australia in the past twenty years, supports a strong case for the contribution of TTC to the accumulation of social capital within society. This finding sheds new light on the potential relationship between social capital and health in the context of TC practice within the TTCS and has important implications for the promotion of TC in health promotion.

Amongst environmental influences, the monetary cost associated with TTC class and workshop attendance was one of the main factors of concern influencing TC practice. Despite the not-for-profit nature of the TTCS, the monetary expense required for either membership or attending special workshops was reported by some participants as one of the main barriers to TC practice. This is also supported by the data that showed two thirds of TC participants in this study were in the middle to high household income range, and consequently raises the question of affordability for paid forms of exercise for people in lower income groups. Similarly, in the U.S., one third of older adults reported they did not engage in exercise because exercise class and gym memberships were too expensive (Roper, 2002). This issue is of less concern in China as TC is normally practised in self-organized groups in 'no pay' public areas, such as streets, parks, squares and riversides (Li, Shen, Ruan, & Zhuang, 2003; Yang, 2004). Furthermore, local Chinese governments financially support the promotion of TC as a public health program. For example, in Jiaozuo 58% of funding for TC promotion was provided by the local government (Yang, 2004). If this model were to be promoted here

in Australia this would enable the culture of TC to become a visible part of everyday life and be a health behaviour available to everyone, no matter their socio-economic status.

In addition to demographic characteristics and environmental factors, another important factor related to TC practice is people's beliefs regarding who is responsible for their health. This was examined in this study using the Multidimensional Health Locus of Control (MHLC) scales.

8.3.4 The influence of Health Locus of Control on Tai Chi behaviours

As understanding individual health beliefs is a prerequisite for successful health education and promotion (Kuwahara et al., 2004), this study examined the impact of individual health locus of control (HLC) on participants' motivations to undertake and maintain TC practice as a health activity. Overall, TC practitioners tended to report high scores in internal HLC (IHLC) and low scores on external factors, such as chance (CHLC) and the influence of powerful others (PHLC). However, when sociodemographic variables were examined, personal beliefs about internal versus external control of health were significantly influenced by age, gender and health status. Specifically, people who were either younger, male or reported an absence of chronic illnesses were more likely to believe their individual behaviours determined their health than their older, female counterparts and those with chronic illness. These findings are consistent with other studies (Owen, 2006; Bailis, Segall & Chipperfield, 2010), where a positive correlation has been described between age and the belief that individual health is largely controlled by external influences. It seems that older people, even in

this study, were more likely to abrogate responsibility for their health to more 'powerful others, such as health practitioners, and to hold a fatalistic attitude towards, and a feeling of powerlessness about, their ability to control their health as they aged.

The finding of increased influence of external factors on older participants' health beliefs in this study is perhaps related to the increasing number of health conditions and age-related changes, which may cause an increased reliance on health care providers and other support services. Participants living with chronic conditions scored significantly lower in IHLC and higher in PHLC than their healthy counterparts. It is possible the results may be a characteristic of this specific sample and not representative of the population in general, as conflicting findings regarding the scores of the MHLC scales have been reported in people with different chronic conditions (Kuwahara et al., 2004; Oliveira et al., 2008). However, such variable findings would appear to indicate individual HLC is likely to be only one of a number of factors that influences a health behaviour, such as TC practice. Nevertheless, the observation for this cohort has important implications for the promotion of TC as a health activity, particularly in older and elderly adults who are suffering from an increased incidence of illness and chronic health conditions.

Taking into consideration the observed differences in HLC between men and women, older and younger age groups, and those with and without chronic conditions, the promotion of TC as a health activity and the design, delivery and evaluation of community-based TC health programs should be tailored according to the audience. An example of where this could be considered is in relation to the mode of delivery when teaching TC. Currently, the teaching strategy employed by the TTCS is where the

instructors demonstrate or model TC movements three times followed by the participant practising the move three times with the instructor and then three times under the observation of the instructor, and then each movement, learnt previously in isolation, is then incorporated into the set of movements learnt to date. In this way TC practice is built incrementally until the whole 108 movements can be practised together under the guidance and modelling of the instructor. However, both the qualitative and quantitative data revealed that the 108 Yang style proved to be difficult to memorise and follow, causing some participants to feel frustrated and lose confidence in TC learning and continued practice. This perceived difficulty, which may in part be explained by the high proportion of seniors in this current study, could result in a diminished level of self-efficacy when considered from a Social Learning Theory (SLT) perspective. Diminished self-efficacy may then, in turn, negatively impact on an individual's beliefs regarding their capacity to control their health and subsequently result in an increased perception that their health is predominately controlled by other influences. Therefore, based on SLT (Bandura, 1997), either a short version of TC, such as the 24-Form TC, or teaching the 108 movements in a series of modules for beginners, could reduce the difficulties in TC learning and increase mastery experience and confidence, particularly for older participants and those with chronic conditions. Similar examples of this approach do currently exist in the area of TC. For instance, Beijing 12, is a short version of TC taught in the Tai Chi Australia Association as a Senior's TC beginner's class in order to allow older adults to practise over a short time span more suited to their physical capacity and to also enable them to memorise TC movements easily (J. S. Han, personal communication, August 2nd, 2012). Similarly "Tai Chi for arthritis", a 12

movement form designed by Dr. Paul Lam, mainly targets people living with arthritis (Lam, 1997). These short modified TC forms offer an alternative for those people who may have special needs related to the decline of either physical or mental functions, which have an increased prevalence amongst the elderly and those with health conditions. As short forms of TC can assist participants to better master and practise TC, this then provides an important pathway by which individual perceived self-efficacy and self-confidence may be increased and participants may progress to longer and more complicated forms of TC.

Another implication of the measure of HLC in this current study is that the patterns of TC were predicted by HLC, where IHLC was the only statistically strong predictor in people with chronic conditions of the frequency of TC practice, attendance at TC classes and extra TC practice outside TC clubs. Although there is no previous research investigating the relationship between HLC and TC practice, a number of other studies have shown that people with higher IHLC scores are more likely to engage in healthy behaviours (Norman, Bennett, Smith, & Murphy, 1998; Steptoe & Wardle, 2001; Kuwahara et al. 2004; Owens, 2006; Grotz, Hapke, Lampert, & Baumeister, 2011; Victo & Haruna, 2012), as discussed previously in Chapter 4. This is also reflected in the findings regarding IHLC and TC behaviours and indicates that an individual's belief in their ability to influence their own health and well-being has a profound effect in initiating and maintaining TC practice. Therefore, consideration of HLC is a crucial element in promoting and developing effective TC promotion programs. That is, the promotion of TC as a health behaviour needs to reinforce and encourage an individual's responsibility for their own health, particularly for those with low IHLC. As an

individual's HLC has been found to be amenable to change following a classroom mind and body wellness intervention in older adults with chronic conditions (Rybarczyk, DeMarco, DeLaCruz, Lapidos, & Fortner, 2001), it could be hypothesized that, by positively emphasising individual responsibility for an individual's own health, personal IHLC would then be enhanced with resultant reduced dependence on outside resources. This would also be effective in assisting people in better coping with difficulties and setbacks associated with TC engagement and adherence.

Responding to the needs of those more dependent on external sources for reinforcement of TC was practised to some extent within the Society. This was reflected in comments by participants who expressed feeling motivated, at times of frustration and disappointment with their slow TC learning progress, by the positive role modelling and assurance that was received from instructors and other members. This positive verbal persuasion would help individuals build their self-efficacy according to SLT. However, this approach could be further complemented to also include strategies, such as positive psychology (Bull, 2008) that actively promote an individual's internal motivation and self-efficacy in relation to their own health management. For example, strategies that reinforce the positive aspects of achievement associated with continuing TC practice could be included in TC practice sessions to increase IHLC and encourage long-term exercise adherence. In addition, the interactions and demonstrations between senior and junior TC practitioners, regional and metropolitan clubs, and even different TC societies, can provide exposure to individual's stories of their varying experiences of TC as well as a visual reinforcement to increase TC interest, self-efficacy and self-confidence. Other strategies, such as the inclusion of discussion time around

promoting health in general and more specifically about the health advantages of TC and the positive effects experienced by local practitioners, would also be helpful in building individuals' self-efficacy and IHLC.

Although understanding people's health locus of control in adopting and adhering to TC as a health activity is important, it is also notable that the overall prediction of HLC on TC practice was statistically small. This further supports the existence of multiple variables affecting TC engagement and adherence and those related to environmental and psychological factors have been examined previously in this discussion chapter. In the next section, the importance of a person's belief that TC practice will achieve what they want it to will be discussed.

8.3.5 Beliefs of the efficacy of Tai Chi as a health behaviour

Factor analysis of the survey investigating participants' perceptions regarding the efficacy of TC revealed most believed that TC was able to improve their capacity to perform daily life activities and physical and mental health, whilst undertaking a safe, relaxing and enjoyable exercise. In addition, three concepts related to people's beliefs about TC emerged from this analysis, namely, "everyday functioning', "psychological health and well-being", and "exercise suitability". This equates to a strong belief in the efficacy of TC as a global health activity that has the potential to have wide-ranging effects on an individual's health. This is evidenced by the majority of participants in this study sample (86%) who continued their TC practice after completing their beginners' class and then went on the have a long mean duration of TC practice.

The exploration of participant's personal beliefs about TC throws light on the

relationship between beliefs about the efficacy of TC and outcome expectations. Findings from the qualitative questions regarding participants' expectations prior to commencing TC were consistent with their beliefs as measured in the 18 item survey. As stated by Bandura (1977), "humans do not simply respond to stimuli; they interpret them" (p. 59). When presented with information regarding TC as a potential form of exercise, people's cognitive abilities enable them to form predictions and expectations, in accordance with their own individual health status and situation, of the potential benefits and any associated risks. This process is based on their general knowledge and beliefs about TC. Given that positive exercise expectations, such as improved health and enjoyment, can influence one's self efficacy judgement (Rhodes & Blanchard, 2007), strong beliefs about the efficacy of TC are likely to have positive psychological implications on personal perceived self-efficacy by producing desirable outcome expectations, as was demonstrated in this current study. Furthermore, consistent with the norm that attitudes and self-efficacy are strong predictors of physical activity intention (Hagger, Chatzisarantis, & Biddle, 2001), these positive beliefs regarding the efficacy of TC would assist with the formation of outcome expectations and then arouse a desire for TC engagement. Likewise the reverse is true that where negative predictions are formed, this would lead to no action. In this study, the high degree of consistency between beliefs and expectations indicates that personal attitudes towards TC are more likely to link to TC behaviour in initiation, adoption and adherence. For example, most participants firmly believed that TC could improve their physical health, relieve pain and enable them to relax and then these beliefs became their main reasons and expectations involved in TC practice. This is supported by other studies (e.g. Chang,

Wallis, & Tiralongo, 2011) where a positive attitude toward the efficacy of an alternative therapy was a strong predictor of TC acceptance and use. Therefore, in TC health promotion, a strategy to strengthen people's belief in the benefits of TC is likely to assist people to form positive expectations, increase perceived self-efficacy and result in more people engaging in TC practice.

The inclusion of the aspect of 'spiritual health', in relation to participant's beliefs that TC improved their everyday functioning, was of particular interest as it adds a further dimension to the potential benefits associated with practising TC. This finding of the spiritual health dimension from the factor analysis was also reflected in the qualitative data where participants reported that TC provided them with "spiritual peace" and "improved spiritual health". This may be influenced by the ethos of the TTCS. The Society was initially established by Mr Moy Lin-shin, a Taoist monk, and consequently Taoist traditional culture and philosophy have formed the basis for the Society and its aims. These include TC being promoted "as a method of 'taming the heart' and developing an attitude of calm, compassion and reduced self-centeredness both during TC practice and in daily life ("Taoist Tai Chi: Internal art," n.d.)". In such a Taoist cultural environment as the TTCS, where "body, mind and spirit are nurtured within and by the culture and community of the Taoist Tai Chi Society" (Giblett, 2008b, p. 170), people are likely to have gradually learned through this cultural lens, which has then helped to shape their own TC culture and values. The religious ethos and sense of spirituality embraced in this culture is likely to have resulted in the impact reported by participants on their TC behaviour, thoughts and health beliefs. Although spiritual health is not included in the definition of health, existing literature has demonstrated

that there are significant links between religion and spirituality and health (Hill & Pargament, 2008; Seeman, Dubin, & Seeman, 2003; Koenig, McCullough, & Larson, 2001). For example, Pargament, Koenig, Tarakeshwar and Hahn (2004) found positive methods of religious coping, such as seeking spiritual support and benevolent religious reappraisals, could help the elderly hospitalized patients to improve their health. Spiritual health is an essential component of an individual's well-being and its integration into the concept of holistic health needs to be considered. As the effectiveness of TC in the context of spirituality is little reported in TC research, these findings shed new light on the contributions of TC to holistic health care. As Giblett (2008a) states "they [TTC and its other arts] are not esoteric practices, but physically and spiritually challenging and rewarding activities that re-align the body, relax body and mind, deepen breathing, resonate through the internal organs and energize every part of the body" (p. 112). However, it is realized that although there is a religious aspect to the Society that may be explored by participants if this interests them, most only take advantage of the exercise and social life on offer, and indeed not all TC associations teaching TC are involved in the religious aspects associated with the roots of TC.

It is worth noting that, due to the diversity in characteristics and functions of physical exercise and activity, it is unrealistic that one instrument would be valid for the measure of all forms of exercise. Traditional western exercises generally emphasize speed, strength and intensity with the consumption of calories and energy, whilst TC is, as previously discussed, characterized as a slow and gentle movement with internal flow of energy within the body. Therefore, the measure of one's belief in the efficacy of TC

should be distinguished from other forms of exercise. This study developed a specific instrument to test personal belief about the efficacy of TC as a health activity and examination of the validity and reliability of the instrument has provided satisfactory results. However, as the study was conducted in an homogenous sample using only the 108 Yang-style TC in the specific setting of the TTCS, further testing using confirmatory factor analysis in a larger and more diverse population of TC practitioners is needed to enhance the wider validity of the instrument.

8.3.6 Individual's expectations of Tai Chi

An individual's perceived consequences of physical exercise strongly influence their decision as to whether they are be likely to become involved in physical exercise (Stroebe & Stroebe, 1995). The present study demonstrates that individuals hold positive and multidimensional outcome expectations, including physical, mental and social perspectives of TC as a health activity, and that their expectations associated with its practice were related to their beliefs of the efficacy of TC.

According to SLT, outcome expectations have multiple dimensions, including physical, self-evaluative and social perspectives (Bandura, 2004), as previously referred to in Chapter 3; thus people can be motivated in different ways to be involved in physical exercise. This appeared to be the case in this study where the range of expectations was not only relevant to physical and mental health outcomes, but also to social life as well. For instance, in the domain of physical health outcomes participants expected to improve general health and well-being, manage the symptoms associated with their chronic illnesses and improve physical functioning in areas, such as balance,

energy levels, flexibility and muscle strength. External to the physical domain they also expected to be able to improve relaxation, reduce anxiety and develop new friendships. Consistent with the notion that outcome expectancy is considered an essential determinant in initiating a new behaviour (Conner & Norman, 2005), these desirable expectations would act as a strong potential stimulus to motivate people to seek TC as their chosen form of exercise amongst the many other types of exercise on offer. This finding is of interest in relation to a previous study that found those who were assigned to a TC training group held higher positive expectations regarding the benefits of TC in comparison to other forms of exercise (Jin, 1992). In addition, this combination of expectations indicates a shift from the need for a single outcome expectation related only to the physical benefits of exercise to a requirement to fulfil multi-dimensional needs related to the person as a whole with physical, mental and social needs.

This current study found that physical outcomes were highlighted as being important more often than social and psychological outcomes. This could have been influenced by the high prevalence of chronic illness (77%) in the sample as health status is strongly associated with physical outcome expectations and is likely to influence the need to place physical health and function as a priority outcome (Wójcicki, White, & McAuley, 2009). This finding supports previous assertions that an individual's health condition is a significant reason to seek TC as part of their chronic illness management.

In addition, the finding, predominantly amongst older participants, that attending TC classes provides social contacts, such as meeting new friends, being with friends and connecting with family members, is also supported by previous research, where older people were found to have higher social outcomes expectations whilst engaging in

physical activity than their younger counterparts (Wójcicki et al. 2009). Social life is a fundamental aspect related to health and well-being and the quality of life, particularly for older adults. Research shows sustained interaction with others can assist older adults with pain management, stress reduction, a feeling of loneliness and loss (Marziali, McDonald, & Donahue, 2008). In addition, exercise in a group can also promote socialization and maintains independence for the aged (Murray et al., 2009). This is again supported by findings from both quantitative and qualitative data in this current study, that the social rewards received as a result of TC practice within the Society were a crucial factor in motivating people to become involved and to maintain TC practice. Many respondents reported they had made friends and built new social networks during TC practice at the club and that these friendships had accompanied and encouraged them in their TC practice. In addition, emotional support from others was a source of comfort and helped them manage hardships in life, such as cancer, medical treatments and personal loss. This finding indicates that, in addition to health outcome expectations, the social aspect of group-based TC practice is a strong motivating factor for participants to both initiate and maintain routine TC, particularly in older and elderly adults.

8.3.7 Motivations to undertake and maintain Tai Chi

Undertaking exercise is a complex and multifactorial behaviour, in which motivation is a crucial factor in determining exercise participation and adherence. Exercise motivations have been described by Ryan and his colleagues (Ryan, Frederick, Lepes, Rubio, & Sheldon, 1997) as being related to either extrinsic reasons, such as a

desire for fitness, health and appearance, or intrinsic motivations, such as inherent interests, enjoyment and competence. This study found motivations to undertake TC embraced a wide range of needs, reflecting the multiple intentions associated with undertaking physical exercise that is consistent with the concept of health, where "health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (World Health Organization [WHO], n.d.).

The main motivating factors in practising TC did, however, vary depending on the stage at which TC learning and practice occurred. The most common reasons for people to initiate TC were to improve physical health (75%), relaxation (46%), psychological health (36%), fitness (28%), energy levels (27%); and to satisfy curiosity (27%) and social interests (23%) whilst also looking for a "suitable" exercise (67%). However, once they had completed beginners' classes and entered the continuing stage, other factors, such as a desire to further improve TC skills, perceived physical and psychological benefits, and a feeling of enjoyment, became prominent. This is similar to DiGiacomo' s et al. (2010) findings where exercise accessibility and appropriateness, both physical and mental engagement and its benefits in health and well-being and disease management have been reported as main factors for TC adherence. It appears participants' inherent interests in improving TC skills, which is also identified by Han (1992) as one of the main reasons for young people to continue their TC practice, and the enjoyment they experienced when doing TC, were more common motivating factors during the continuance stage than the desire for health benefits. This finding indicates that extrinsic motivations, such as health and fitness, were predominant in prompting TC involvement; whilst intrinsic motivations such enjoyment and skill improvement

were more likely to relate to TC adherence.

Although the desire to improve physical health was the outstanding factor influencing people's decision to undertake TC, psychological health also emerged as a salient reason for engagement, which may reflect the high proportion of mental health conditions reported in this study sample and their strong beliefs that TC benefited mental health and assisted with relaxation, stress and anxiety management. This finding is also in line with Han's (1992) study, where relaxation was listed as one of the top reasons for people to initiate TC. It would seem that the relaxation effect of TC has been well recognized and accepted by Australians and serves as a characteristic that distinguishes TC from other forms of physical activity and often results in people choosing TC as their preferred form of exercise. The possible explanation for this could be a result of an increased public awareness of mental health and the growing number of research studies exploring the role of TC in psychological health and well-being in the last two decades (Wang, Bannuru, et al., 2010; Sandlund & Norlander, 2000; Dechamps, Lafont, & Bourdel-Marchasson, 2007). With the growing awareness of the positive effects of TC on health and relaxation, it is not surprising to find people seeking a CAM activity, such as TC, as a strategy to cope with mental problems and life stressors. However, there is still a paucity of research on the mechanism of the effectiveness of TC on relaxation and stress reduction. This current study pointed to participants holding strong beliefs regarding the positive effects of TC on relaxation, depression, anxiety and stress reduction, indicating a need for more experimental studies in this area of TC and psychological health.

Enjoyment was identified from both qualitative and quantitative data as being an

essential reinforcing factor for the continuation of TC practice. Furthermore, several elements were also identified as contributing to the enjoyment experienced. These included the challenge and performance of the TC itself, the exercise environment, the teaching experience (both from an instructor's and a participant's perspective) and the social contacts made. This adds new information from that published in another study (Wininger & Pargman, 2003), where background music, exercise instructors and individual exercise role-identity were strongly and positively correlated with exercise enjoyment. It should be noted that the attributes of enjoyment emerged not only as an emotion that accompanied participants' direct experience during TC practice, but also as a result of the social integration and interaction with people in the TC exercise environment. This once again confirms the importance of social environment in TC practice.

Overall, TC practitioners were motivated by the ability of TC to provide an inclusive form of health management that met both individual needs and the special demands of physical exercise. This finding adds further to the understanding of the commonly used term 'suitable exercise' in relation to why people sought out TC as an exercise. What defines 'suitable' can be very individual and could relate to a range of determinants, such as age, gender, health status and personal circumstances. This was made evident in both qualitative data and the factor analysis where the third factor extracted was named "exercise suitability". This emphasised the importance of various aspects of TC, such as safety, relaxation, enjoyment and benefits for physical health.

8.4 Perceived Benefits of Tai Chi for Individual Health and Well-Being

Consistent with the findings reported in the literature review, participants in this study perceived a wide range of benefits related to their health and well-being as a result of TC practice. Findings from both the quantitative and qualitative data revealed these benefits were reflected in physical, mental, social and spiritual aspects of their lives. This was largely consistent with participants' expectations. However, some benefits were unexpected and consequently considered to be 'a bonus' by respondents. Noticeably, the benefits experienced extended directly to participant's day-to-day performance and consequently impacted on their life and work in a variety of positive ways.

8.4.1 Physical benefits

This study found there was an increase in participant's perceived health status after taking up TC as an exercise with an increase from 30% to 58%, of those who reported their health status as being either very good or excellent. This percentage is slightly higher than the national level of 56% (AIHW, 2008a), and is a very positive outcome considering the age and self-reported health problems of the sample in this study. The most frequently reported physical benefits were improvements in general health and physical ability, such as balance, body agility, muscle strength and mobility. Participants also noted improved symptom control associated with their chronic illnesses, particularly in relation to pain relief and reduced joint stiffness, which they also reported resulted in less medical interventions, a reduced need for medication and

reduced doctor visits. These perceived physical benefits are consistent with the literature previously discussed in Chapter 2, where clinical trials have shown positive effects of TC on health and well-being in a variety of medical conditions.

In line with previous qualitative findings (Morris, 2006), this current study also found participant's reported a greater awareness of body posture and body weight shifting when moving and lifting after having taken up TC. Many reported this resulted in them avoiding exercise and work-related injuries and also facilitated an awareness of consciously controlling their body balance and coordination. This indicates TC has the potential to promote individual independence through a feedback system where the improvement of body coordination and mobility improves self-efficacy, which in turn increases a person's ability to exercise and perform everyday activities more effectively (Giblett, 2008a). Indeed, this was confirmed both through factor analysis and by participants commenting on their increased ability and confidence in performing their everyday activities, such as housework, gardening, and even travelling. This, in turn, engendered a feeling of independence and a sense of achievement. Furthermore, improved symptom management either related to chronic conditions or age-related processes also increased participants' sufficiency to undertake daily life activities independently. For example, many participants noticed and reported a reduction in pain. Although this current study was not a longitudinal and experimental study, participants involved in this survey had a mean duration of TC practice of six years, which would confirm the benefits of a long-term TC practice for people who suffer chronic musculoskeletal conditions, such as arthritis and back pain. These findings also provide supporting evidence that through TC an individual's ability to undertake everyday

activities independently is facilitated with resulting improvements in self-efficacy that then have the capacity to become self-perpetuating.

The promotion of balance as a consequence of TC practice has significant implications in older populations. It is well-documented that older people and those with chronic health conditions are more likely to have poor balance and a subsequent high risk of falls; hence falls and fall injury are an important health challenge. Research shows balance, muscle strength, fear of falling and falls experience are all risk factors associated with falls in older people (Sherrington et al., 2008). Although literature shows approximately 30% of older adults aged 65 and over experience falls each year (Logghe et al., 2010), TC practitioners in this current study reported a relatively low falls experience (5%) despite the high proportion of older participants with a high risk for falling. Clinical studies (Wolf et al., 1996; Wolf et al., 2006; Li, Harmer, Fisher, & McAuley, 2004; Li et al., 2005; Woo, Hong, Lau, & Lynn, 2007) also suggest that TC has a positive effect in reducing falls or falls risks in older and elderly adults. For example, a recent meta-analysis (Logghe et al., 2010) examining randomized controlled trials investigating the effect of TC on falls rates found a significant falls reduction of 49% in favour of TC. However, the effect of TC in fall reduction remains inconclusive due to conflicting results (Logghe et al., 2010). Some variables, such as exercise frequency and length, and the characteristics of the sample population, play a determinative role in the effect of TC on outcomes, such as falls (Low, Ang, Goh, & Chew, 2009; Logghe et al., 2010), and may explain the inconsistency in results reported in other studies that employ a short term TC intervention and low exercise dose.

In line with the findings from this current study combined with other published

studies (Li, Harmer, McAuley, Fisher, et al., 2001; Dechamps et al., 2007), it is proposed that regular TC practice has the potential to reduce falls through its effect on physical performance and self-efficacy. However, disappointingly, a recent Australian study (Dafna, Carmen, Kamalesh, & Adrian, 2011) found only 1.4% of Australia's adults over 65 years practise TC. Instead the preferred exercise of this age group was reported to be walking, with over 45 per cent preferring this form of exercise. The study also points out that, although walking is a good exercise, it "may not provide optimal protection for other age-related health conditions. For example, the most efficacious exercise programs for falls prevention were those that included high challenge balance training, for example tai chi or guided balance exercise, with walking of no proven benefit " (p. 217). This current study supports the suggestion by showing that TC is a global health behaviour that includes physical benefits that have a strong emphasis on balance and flexibility.

8.4.2 Psychological benefits

In addition to the physical benefits reported, this current study's findings support the hypothesis that TC is an effective exercise to also improve psychological well-being. An increased ability to relax, better mental functioning and improvements in the attributes of self-esteem were reported by most TC practitioners as both an anticipated and unanticipated result of practising TC. Specifically, TC practitioners reported experiencing physical and mental relaxation, stress reduction, better sleep, memory and concentration, enjoyment, increased confidence and a sense of achievement, positive attitudes towards themselves and others, and a sense of community involvement, which

all contributed to their physical and psychological health and well-being. These findings are supported by other studies (Tsai et al., 2003; Wang et al., 2009; Wang, Bannuru, et al., 2010; Sandlund & Norlander, 2000; Esch, Duckstein, Welke, Stefano, & Braun, 2007), where a positive effect of TC on physical and psychological health has been observed specifically in relation to its effect on relaxation, stress and anxiety.

The mechanism by which TC produces relaxation and stress reduction remains unclear. One possible explanation is through the intense concentration of the mind, which is essential for effective TC practice. Practitioners in this study reported that TC provided a focus away from personal issues due to the concentration required to perform the TC movements and that immediately following TC they felt relaxed, peaceful and calm. This is consistent with the general description that TC is a "moving meditation" (Ospina et al, 2007). Furthermore, the TTCS promotes a non-competitive and non-pressure exercise environment, which would also facilitate a relaxing environment in which learning and practising TC may take place. The reports of relaxation and calmness are supported physiologically by experimental research that shows a significant reduction of cortisol and lactate amongst TC practitioners as a result of TC practice (Esch et al., 2007).

The effects of TC on psychological health are likely to be multifactorial and variables already discussed, such as improvements in self-efficacy, in addition to physical and physiological effects, point to the broad range of factors that require consideration. However, what is notable is that the psychological effects reported are achieved in a natural way and provide a drug free means of either relieving anxiety and stress or as an adjunct to medical therapies. One important aspect that emerged from

this study's findings in relation to improved psychological health was that of increased self-esteem.

8.4.3 Volunteering as a determinant of increased self-esteem

Findings from this study have shed light on the relationship between TC and the attributes of self-esteem that could be improved through TC practice. Tafarodi and Milne's dichotomous classification of global self-esteem (2002), which incorporates the sub-domains of self-competence and self-liking, proved an appropriate framework to analyse the benefits reported by participants in the qualitative component of this study. Using this framework analysis revealed that participants acquired significant gains in individual self-esteem through practising TC within the context of the not-for-profit TTCS. Specifically, within the domain of self-competence, TC practitioners in this current study reported high levels of positive perceptions in relation to an increased sense of achievement, self-confidence, and mastery of new skills and, within the domain of self-liking, they reported increased enjoyment, community involvement and development of positive attitudes. Interestingly, many of the reported positive changes were experienced within the context of their volunteering, although some non-volunteering practitioners also reported positive changes in self-esteem.

The volunteer associated improvements in self-esteem are reflected in the high proportion of respondents (68%) who were involved in one or more of the wide range of volunteer positions within this society. The proportion of people volunteering within the TTCS was almost double that reported by the General Social Survey in Australia (Australian Bureau of Statistics, 2011b), where 36% of Australian adults reported being

involved in some form of volunteering. Moreover, compared with other studies, where volunteer characteristics included being female, middle-aged, employed and an English native speaker (Australian Bureau of Statistics, 2011b), and those with high levels of physical and mental well-being (Thoits & Hewitt, 2001), the volunteers in this study were characterized as older with a mean age of 63, female, educated, married and retired, with a high proportion living with chronic conditions, including mental health problems. However, the observed differences in characteristics are likely explained by the specific nature of this current study's sample and the environment in which they were learning and practicing TC.

Volunteering is an activity where people commit their time and effort to deliver services to, or help, others without direct financial compensation. The determinants to take up volunteering are diverse and include a range of individual, cultural, environmental and social factors (Thoits & Hewitt, 2001). In this study, the high proportion of volunteers within the Society likely relates to one of the Society's four core principles "to help others" ("Taoist Tai Chi Society of Australia," n.d.), which was strongly exemplified by the founder, Mr Moy Lin Shin, throughout his life. Such role modelling is an intricate part of the Society's Taoist ethos, which advocates and encourages all members to be actively involved in the Society to ensure TTC is made available to all communities internationally in order to promote health and cultural exchange. This influence is evidenced by 93% of respondents reporting they felt motivated to help one another within the Society. For instance, the notion expounded by the Society that "teaching is a privilege" (Instructor's Handbook of the Taoist Tai Chi™ Society of Australia, 2010) encourages practitioners to become instructors and selflessly

give of their time and effort to teach and help others. Such community-oriented values and attitudes towards volunteering appears to have profoundly impacted people involved in this society. This was exampled by the many respondents in the study who reported being impressed by the generous contributions and offerings in time, effort and expertise that were committed by the volunteers. Consequently new members are not only exposed to the concept of role modelling as a method of teaching the physical movements in TC but also by the volunteer structure of the Society, which could be their main impetus to also become a volunteer.

This study also found that volunteering within the Society was a reciprocal process. That is, by willingly giving time and effort to the Society and others, volunteers also profited as a consequence of their unpaid service. This was reported in the form of positive changes to their life, such as increased enjoyment, confidence and a sense of achievement, in addition to an aroused sense of community involvement and the acquisition of new skills. They also experienced more positive attitudes and an improved outlook towards themselves, others and the communities. For instance, volunteer TC instructors reported great enjoyment and self-achievement in teaching and interacting with both learners and novice TC practitioners. This finding is not surprising as existing research has indicated that volunteering is positively associated with happiness, self-esteem, life satisfaction, sense of control over life, and physical health (Thoits & Hewitt, 2001; Borgonovi, 2008). It is apparent that people have developed an increased sense of self-worth, self-satisfaction and self-identity through their feeling that they are contributing or belonging to a voluntary society and community. This is particularly important for people in older age. Compared to younger people, older

volunteers can experience more life satisfaction and greater positive changes in their perceived health from volunteering (Van Willigen, 2000).

This current study's finding of improved self-esteem in a cohort of older and elderly Australians with a high prevalence of chronic illness is an important one, particularly in relation to psychological health. Research shows the level of self-esteem varies through the lifespan, with a general increase throughout adulthood that is followed by a sharp decline from the ages of 60 to 80, with a general worsening at age 70 (Robins, Trzesniewski, Tracy, Gosling, & Potter, 2002). The factors related to the decline are diverse. In addition to individual factors, a number of life changes that tend to occur in older age, such as health problems, declining socioeconomic status, spousal loss and cognitive impairments, all have a negative impact on self-esteem (Robins et al., 2002). In addition, societal perspectives on aging, such as ageism and retirement, may pose a perceived decline in self efficacy, self-worth and self-esteem (Murray et al., 2009; McMinn, 2009). The opportunity to undertake a wide range of volunteering positions within the TTCS enabled people to regain a feeling that they could still contribute to the lives of others and to that of the community, which, in turn, rewarded them with a sense of belonging. This would satisfy their psychological and emotional needs as "the older adult views self with real humility as a participant in and contributor to the improvement of society" (Murray et al., 2009, p. 611).

In addition, the reciprocity associated with volunteering was not only limited to health and well-being; it also had an impact on work performance. Some respondents reported experiencing more confidence and a higher level of skill in activities, such as public speaking, management skills, and leadership skills as a result of being involved

in the various forms of volunteer jobs within the Society. They reported this unanticipated benefit resulted in a sense of achievement and increased confidence, which also contributed to individual esteem and improved health. Consequently this study has shown that not only is the feeling of accomplishment in relation to TC itself important in raising self-esteem among the elderly but the setting and context in which TC practice occurs also plays an essential role. This strengthens the conclusion that volunteer roles, when undertaken in conjunction with health activities, such as TC, provide an opportunity to enhance exercise involvement and adherence, especially in seniors, in addition to providing benefits associated with improved esteem.

Volunteering was, however, not always viewed by participants as a positive activity. As suggested by Hager and Brudney (2004) "benefits from volunteers and challenges in managing them are two sides of the same coin" (p. 2). This was manifested by a small number of participants expressing concerns about the pressure they felt to volunteer. For instance, some respondents felt overloaded with work due to what they perceived were high and unrealistic expectations in relation to volunteering in the Society. However, since a measure of the number and type of volunteer work hours was not undertaken in this study, it is unclear whether the perceived pressure was from excessive volunteer work hours or external factors. Nevertheless, this finding and findings from another study (Thoits & Hewitt, 2001) suggests an appropriate workload in accordance with individual situations, skills and demands should be taken into consideration in order to provide volunteers with a positive experience and better manage volunteering work, which, in turn, motivates them to better contribute to the Society and others.

It is important to note that the attributes of self-esteem identified in this study may have limited generalisability as this study was not designed to specifically measure self-esteem. Instead, the attributes of self-esteem observed in this study emerged from participants' responses regarding their perceptions of the benefits of TC practice. However, as the comments, which were elicited through open questioning and reflected participant's lived experiences, were analysed and categorised using Tarofodi's (2002) classification of self-esteem as a framework, this lends considerable confidence to this study's findings of improved self-esteem as a result of undertaking TC.

8.5 Barriers to Tai Chi Practice

Although TC has provided a wide spectrum of perceived benefits, TC practitioners, like other people engaging in exercise, also encountered a variety of barriers. These barriers were divided into two domains, personal and environmental. Personal factors included physical limitations, negative perceptions and a busy life schedule, while environmental factors were identified as administrative issues inside the Society, perceived pressure and teaching approaches. Generally speaking, personal factors were more prominent and lack of confidence, teaching methods and time restriction due to work and family obligation were reported as the most common barriers to TC adherence. Some of the barriers experienced in undertaking TC have been previously discussed in relation to the characteristics of participants, their locus of health beliefs and environmental influences on TC practice. Therefore the focus here will be on reported adverse effects related to TC practice and the associated risk management implications.

The risk management consideration related to the findings in this study is predominantly associated with muscular skeletal pain. The review of the literature suggests that TC is classified as a low to moderate intensity exercise and is consequently recommended as a safe exercise suitable for older adults and those who are suffering from chronic conditions, such as arthritis and heart problems (Yeh, Wang, Wayne, & Phillips, 2008). This is also reflected in the 'feeling of safety' reported by participants in relation to practising TC in this study, which could be the key to explaining the phenomenon of why the majority of TC practitioners are older and elderly. However, adverse effects were still reported in this present study, which were generally related to muscular skeletal pain.

The reports of muscular skeletal pain are consistent with other studies (e.g. Wang, 2011), where 48% of students (n = 27) suffered from knee injuries of differing degrees during TC practice. It has been proposed that this pain is most likely to be due to muscle tension and strain caused by incorrect posture whilst practising TC (Hu, 2007). Such injury is more likely to occur in new TC practitioners but can be avoided by using correct TC postures and appropriate warm up exercises. Hu (2007) recommends, for senior TC practitioners, a high posture and slow rotation with a small angle during TC practice to avoid too much tension on knees and to prevent the likelihood of strain and injury. This is indeed the adopted method for TTS practitioners in the TTCS. During the early learning stage, there is little up and down movement, which is one of the distinctive features of TTC as developed by Mr. Moy. Additionally, warm-up exercises, such as Dan-Yu and Tor-Yus in continuing classes, strengthen and provide support to the knees by sitting into the hips (R.Giblett personal communication,

June 5.2013). However, as reports of strain and injury were received in the study, although infrequently, this is an important area that requires emphasis during instructor education.

Education in the area of risk minimisation is an important aspect as there was some variation in teaching strategies reported by participants. Some instructors used verbal instructions in addition to demonstration, whilst others provided demonstration in silence rather than giving verbal instructions. Some TC beginners reported the latter method was more difficult to follow. The absence of detailed verbal instruction may not only leave many aspects of the movements open to individual interpretation but also the risk of injury, particularly so with beginners and those who are vulnerable, such as the elderly and those with chronic illness. Therefore, TC instructors should be qualified and have experience working with older adults with disabilities (Adler and Roberts, 2006). As an example, one study ensured the TC instructor employed for the TC intervention group was certificated as a "Health and Fitness Instructor" by the American College of Sports Medicine (ACSM) with training and teaching experience in TC to ensure appropriate skills in teaching, supervising and leading TC class and risk management in TC practice (Janelsins et al,.2011).

In the TTCS, although the structure of what is taught in relation to content is standardised within Australia and instructors are required to attend regular seminars and training workshops, it may also be of benefit for the Society to provide associated training on how to tailor teaching strategies that are appropriate to the variety of different types of learners they may encounter in their classes and risk management for those who are compromised in relation to age and health. Whilst there are advantages to

a variety of teaching strategies that allow participants to choose instructors best suited to their personal learning needs, teaching by demonstration with minimal verbal reinforcement may be more suited to continuing learners than beginners. Whatever approach is taken, there is a place for awareness training for instructors regarding the impact of different teaching strategies and the varying needs of individuals who enrol in beginner's classes. These needs range from the preferred learning styles of participants to strategies that would minimise the risk of injury and sensitivity to any perceived peer pressure to perform to a certain standard that participants might experience when undertaking TC. An awareness of the potential for injury particularly amongst new learners and those of older age is essential. As any emerging pain could be the expression of a potential problem, it is important to encourage practitioners to report pain and have instructors address any issues related to the practise of TC as they occur.

8.6 A Summary of Recommendations for Future Directions

In summary, the recommendations for future directions that have been discussed in detail above are now itemised below. These recommendations are related to health promotion, TC association governance, TC teaching and learning, and future research.

Recommendations for Tai Chi health promotion planners

- Endorse, fund and promote TC as a public health activity through the integration of TC into community, aged care and workplace health programs;
- Update and provide information and education related to TC to health care providers, thereby enhancing their capacity and confidence to provide health consultation to the public in relation to the suitability and benefits of TC;

- Consider accreditation of TC instructors to develop and ensure instructors' skills in teaching, supervising and leading TC sessions and the maximisation of risk management in TC practice.

Recommendations for Tai Chi organizations

- Tailor the design and delivery of TC lessons according to individual's needs and learning styles;
- Develop effective strategies to emphasise an individual's responsibility for their own health, particularly in older adults and those with health conditions, and increase their beliefs in the efficacy of TC;
- Consider making available versions of TC of varying lengths to alleviate the difficulties encountered at the early stages of TC learning and to enhance individual self-efficacy and mastery experience through incremental learning;
- Promote TC to those with chronic health conditions who do not currently seek out TC as a health activity, such as those with diabetes;
- Provide additional training for TC instructors to enable them to skilfully instruct TC in accordance with individual's health needs and varying locus of control and to prevent exercise injuries.

Recommendations for Tai Chi teaching and learning

Those who are responsible for teaching TC can enhance learner's experiences and successes in a variety of ways, by:

- Developing an awareness of the impact of different teaching strategies, teaching environments, and learners' varying needs relating to the adherence to TC. This

may include oral instructions to demonstrate techniques to facilitate TC learning and prevention of adverse effects;

- Encouraging self-paced learning and exercise level in a non-pressure environment, particularly for those with restrictions due to ageing or illnesses;
- Including oral instructions to demonstration techniques to facilitate TC learning and prevention of adverse effects;
- Ensuring the necessary information is obtained from participants regarding their health status and exercise limitations and then assessed to ensure optimal learning and risk management;
- Promoting the aim of 30 to 60 minutes of exercise per session three times weekly for group-based TC practice, and 30 minutes for at least five days per week for individual TC practitioners, if it is their sole form of exercise.

Recommendations for future research

This study has resulted in the development of the Tai Chi Health Behaviour Model to describe how people change their behaviour through TC practice in order to achieve a holistic, or global, health status, in addition to the development of an instrument designed to test people's beliefs about the efficacy of TC. Further testing of the model and instrument in a large population with different TC styles is needed. In addition, a number of other potential research areas were also highlighted as a result of this study's findings:

- Consistent with other studies, this study has also demonstrated TC can help people to relax and reduce stress levels. Future research should endeavour to

investigate the potential mechanism of the relaxation effect and stress reduction as a result of TC practice.

- The effect of volunteering on self-esteem in the context of a TC organisation should be further explored with the specific aim of investigating this outcome using psychometric instruments and comparison groups in conjunction with qualitative data.
- This study has shed new light on the effectiveness of TC in the context of spirituality as a part of holistic health care and the relationship between social capital and health. Future studies should investigate the role of spirituality and social capital in individual health and health behaviour, particularly in older populations and those with chronic illnesses.
- Studies examining the benefits of TC should incorporate operational definitions that consider the impact of the style, frequency, intensity and duration of the TC being investigated.
- Translational studies should be undertaken to investigate the usefulness of varying forms of community and work based TC programs on the health and well-being of their participants, to further inform public health promotion using TC

8.7 The Limitations of this Study

This study has provided valuable information in the context of a real life setting and has answered the research questions with reference to social learning theory. The findings have subsequently provided support to the wide range of clinical trials that

have shown TC is a health activity with physical, psychological and social benefits that positively impact on TC practitioners' health and lives. However, there are limitations associated with response bias, the sample setting and the methodological design.

Response bias is a common problem when using a survey design and attempts have been made to minimise its effects through random selection of potential participants who were enrolled members over a timeframe of six months. However, people who were practising continually at the survey time would have been more likely to be interested in the subject matter and consequently motivated to return the questionnaire, while those who had no longer engaged in TC practice might not have been so motivated to complete the questionnaire. This is reflected in the long mean duration of TC practice amongst the participants resulting in data being more representative of long-standing TC practitioners.

Moreover, the setting chosen for this study was the TTCS, which uses a form based on the classic 108 Yang-style TC. It might reasonably be argued that different styles of TC and management models of TC organizations may lead to different experiences and perceptions amongst TC practitioners.

In addition, potential limiting factors related to design include the analysis technique used in the interpretation of qualitative data provided by respondents in the open-ended questions. Although this was guided by the knowledge presented in existing literature related to TC and health, disparity in interpretation can be influenced by research aims and purposes and researchers themselves. However, the researcher is confident such a limitation was minimised by rigorous application of analytic techniques outlined in the methods chapter. There is also an argument that the

application of predesigned themes in the content analysis of this study may have affected the integrity of findings from the qualitative data. However, this technique was chosen specifically to provide the opportunity to illustrate how the data provided evidence for the chosen themes. This was essential to the aims of the study in reporting practitioners' perceptions of the effect of TC on their health and well-being from their individual lived experiences. In addition, in-depth discussion and regular meetings between the researcher and her supervisors during research design, content analysis and interpretations were undertaken over many interactions to substantiate the conclusions drawn and despite the pre-defined themes there were rich findings represented in the sub-themes and categories that emerged from the data.

Despite actual and potential limitations, this study makes important contributions to the existing literature on TC in a Western context. It has described the patterns of TC practice in relation to practitioners' demographic characteristics and beliefs about control over their health, as well as the impact of the perceived effectiveness of TC on their health and life. These perceptions, offered by a large cohort of practitioners who have been undertaking TC for a substantial mean duration of time, provide strong support for experimental studies reporting the benefits of TC. It also provides valuable information to the merits, efficacy and potential adverse effects of TC, and motivating and impeding factors associated with its practise. These, in turn, reveal inherent and indispensable elements necessary for successful TC health promotion. It is hoped this study's findings will provide the basis for further research in understanding and predicting the impact of TC as a health behaviour on health self-management strategies, particularly in the elderly and those with chronic health conditions.

8.8 Conclusion

The growing worldwide popularity of TC practice has been accompanied by the emergence of the TTCS as one of the main places where the 108 Yang-style TC in a setting of Taoist culture and beliefs is being disseminated, taught, and practised in Western societies. This study has described in detail, for the first time, the characteristics of TTC practitioners in WA and their patterns of TC practice. In addition, this study also identified those factors that positively and negatively influenced people in TC initiation, adoption, practice and adherence. As a result of TC practice, most TC practitioners perceived a wide range of benefits, which encompassed physical, mental, social and spiritual aspects, including positive changes in self esteem within the context of their volunteering in the TTCS. These perceived benefits provide evidence supporting the findings from clinical trials, and reflect that TC is more than just an exercise but represents a global health behaviour.

In addition, this study has resulted in the development of the Tai Chi Health Behaviour Model, which depicts how people adopt, initiate, practise and maintain TC practice in the context of person-environment interplay in order to achieve a holistic health status. Furthermore, an instrument to assess people's general beliefs about TC, which is considered an essential determinant in forming outcome expectations and initiating a new behaviour, has been developed and tested. This helps researchers, TC associations and health promotion planners better understand TC behaviour and develop effective strategies in TC health promotion and TC adherence. Finally, this study has resulted in a series of recommendations for the promotion of TC, TC Association

governance, TC learning and teaching and future research into TC practice.

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List of Appendices

Appendix A: Permission from the International Taoist Tai Chi™ Society

TAOIST TAI CHI SOCIETY OF AUSTRALIA INC
Head office: 52 Railway Parade, Bayswater WA
Postal Address: PO Box 311, Bayswater WA 6933
Phone: (08) 9371 7033 Fax: (08) 9371 7066 Email: australia@taoist.org
ABN: 35 295 945 206 An incorporated not-for-profit organisation www.taoist.org.au

25 February 2010

Dr Cathy Fetherston
School of Nursing and Midwifery
Murdoch University
PO Box 1937
Mandurah
WA 6210

Dear Dr Fetherston

Thank you for your letter on behalf of your student, Ms Li Wei, proposing that the Taoist Tai Chi Society of Australia (Western Region) work with Ms Wei in her research into the reasons why people choose Tai Chi as a method of improving their health, and for subsequently meeting with Sandra Wilson and me to give us more information about the proposal.

You made it clear that the Taoist Tai Chi Society of Australia would be the only Tai Chi provider taking part in the research and that the Society would have an active involvement in the design and review of the project.

After careful consideration we believe that the project should add meaningfully to the information available to health professionals about the health benefits of Taoist Tai Chi™ arts of health and will, in addition, provide useful information to the Society about the choices of members and potential members. We are, therefore, willing to assist Ms Wei with her research.

The Society will provide you with appropriate access to our mailing list in order to contact our members to participate in this study. Our understanding is that you will meet the costs of postage and mailing, and will make arrangements for printing and filling of envelopes.

We would like to invite Ms Wei to learn the Taoist Tai Chi set as part of her initial research. The metropolitan branches have Beginner classes starting soon and, as her choice of Branch will depend on her own circumstances, we would recommend that she look at the website www.taoist.org.au for further information.

We look forward to a fruitful collaboration.

Yours sincerely

Heather Williams

Ms Heather Williams
President, Western Region
Taoist Tai Chi Society of Australia

Appendix B: Invitation Letter for Questionnaire

TAOIST TAI CHI SOCIETY OF AUSTRALIA INC
Head office: 52 Railway Parade, Bayswater WA
Postal Address: PO Box 311, Bayswater WA 6933
Phone: (08) 9371 7033 Fax: (08) 9371 7066 Email: australia@taoist.org
ABN: 35 295 945 206 An incorporated non-profit organisation www.taoist.org.au

October 2010

Dear Member

Please find enclosed a questionnaire and covering letter from a researcher at Murdoch University. We invite you to participate in this research study by completing and returning the questionnaire, if you are agreeable.

Earlier this year the Western Region Council was approached by Murdoch University's School of Nursing and Midwifery in regard to participating in a research study by Masters student, Ms Li Wei, into the reasons why people choose Tai Chi as a method of improving their health.

In consultation with the Society's international medical adviser, Dr Bruce McFarlane, the National Management Committee, and other senior members of the Society it was decided that the project would make a meaningful contribution to the information available to health professionals about the health benefits of Taoist Tai Chi™ arts of health. In addition, we believe the study has the potential to provide useful information to the Society about what members perceive to be the benefits of Tai Chi and the reasons why members and potential members may choose to practice Tai Chi. We therefore agreed to assist Ms Wei with her research.

In order to safeguard the privacy of our members the Society is managing the mail out of the questionnaires. The Society will not be providing information about any member to Murdoch University. The questionnaires will be returned directly to Murdoch University and the Society will not be involved in handling the responses.

We encourage you to take the time to participate in this survey.

Yours sincerely

Heather Williams

Ms Heather Williams
President,
On behalf of the Western Region Council
Taoist Tai Chi Society of Australia

Appendix C: Participant Information Letter

Murdoch UNIVERSITY

www.murdoch.edu.au

Information Letter

A study into the:
Patterns of use of tai chi and perceptions of its effects on health and well-being in people who undertake Taoist Tai Chi™ in Western Australia

Dear Participant,

We invite you to participate in a research study that seeks to describe how people practise Taoist Tai Chi™ and their perceptions about its effects on health and well-being. We would very much value your response even if you no longer attend Tai Chi classes or belong to the Taoist Tai Chi Society. This study is part of my Degree in Master of Philosophy, supervised by Dr Catherine Fetherston and Ms Kristina Medigovich at Murdoch University.

Nature and Purpose of the Study

Tai chi plays an important role in the prevention, treatment and rehabilitation of physical and psychological illnesses in a wide range of different people. However, there is little known about how tai chi is practised, what factors may prevent or motivate people to practise tai chi or what practitoners' perceptions are regarding its effects on health and well being. Therefore this study aims to investigate these factors, specifically amongst Taoist Tai Chi™ practitioners in Western Australia.

What the Study will Involve

If you decide to participate in this study, ***you will be asked to complete and return the attached questionnaire in the self addressed envelope provided.*** We ask you do this ***as soon as you can***, preferably within two to three weeks of receiving the questionnaire. It is estimated the questionnaire will take approximately 15-25 minutes to complete.

On completion of the study a summary of the research findings will be available at all WA Taoist Tai Chi branches and on the Murdoch University School of Nursing and Midwifery web-site. If you wish to be sent a personal copy of the summary of the study's findings, or if you wish to go into the draw to win the ***$150 cash prize***, please supply your name and postal address at the end of the questionnaire. Your name and details will be stored separately from the questionnaire and all survey data will remain anonymous. Only the winner will be contacted when the prize is drawn on Wednesday, 15th December 2010. If we are not able to contact the winner by one week from the draw, a redraw will take place on Monday 20th December 2010.

CRICOS Provider Code: 00125J
ABN 61 616 369 313

Voluntary Participation and Withdrawal from the Study

Your participation in this study is entirely voluntary. All information is treated as confidential and no names or other details that might identify you will be used in any publication arising from the research.

If you consent to take part in this research study, it is important that you understand the purpose of the study and are happy completing the questionnaire. Please make sure that you ask any questions you may have, and that all your questions have been answered to your satisfaction before you return your questionnaire. If you decide to withdraw from the study once you have returned your questionnaire, it may not be possible to remove the information you have supplied.

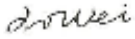
Benefits of the Study

It is possible that there may be no direct benefit to you from participation in this study. However it is anticipated that the results from the study will help provide important information to both the Taoist Tai Chi Society and to Health Professionals working with people with chronic illnesses and in the area of health promotion. Understanding how Taoist Tai Chi™ practitioners practise tai chi will assist health professionals to help others investigate tai chi as a self-management strategy to maintain or improve their health and wellbeing in the future.

If you have any questions about this project please feel free to contact either myself, Mrs Li Wei on mbl. 0422561734 or my supervisor, Dr Catherine Fetherston, on ph. (08) 9582 5516. My supervisor and I are happy to discuss with you any questions or concerns you may have about this study.

Thank you for your assistance with this research project.

Yours sincerely



LIWEI
Master of Philosophy candidate
Murdoch University

This study has been approved by the Murdoch University Human Research Ethics Committee (Approval 2010/189). If you have any reservation or complaint about the ethical conduct of this research, and wish to talk with an independent person, you may contact Murdoch University's Research Ethics Office (Tel. 08 9360 6677 or e-mail ethics@murdoch.edu.au). Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.

Appendix D: Participant Consent Form and Questionnaire

Murdoch UNIVERSITY

QUESTIONNAIRE

www.murdoch.edu.au

Patterns of use of tai chi and perceptions of its effects on health and well-being in people who undertake Taoist Tai Chi™ in Western Australia

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Participant Consent

I have read the Information Letter about the nature and scope of this survey. Any questions I have about the research process have been answered to my satisfaction. I agree to take part in this research by retuning this questionnaire in the reply paid envelope supplied.

In returning the questionnaire I give my consent for the results to be used in the research. I am aware that this survey is anonymous, so I acknowledge that once my survey has been submitted it may not be possible to withdraw my data.

I understand that all information provided is treated as confidential by the researchers and will not be released to a third party unless required to do so by law.

I understand that the findings of this study may be published and that no information which can specifically identify me will be published.

IF YOU RETURN YOUR QUESTIONNAIRE IN THE REPLY PAID ENVELOPE PROVIDED, YOUR NAME WILL GO INTO A DRAW TO WIN A $150 CASH PRIZE

Please supply your name and postal address at the end of the questionnaire if you wish to go into the draw

Your name and details will be stored separately from the questionnaire and all survey data will remain anonymous

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CRICOS Provider Code: 00125J
ABN: 61 616 369 313

Section A

Some questions about your Taoist Tai Chi™

A1. Where did you *first* hear about Taoist Tai Chi™? (please tick the answer which applies)

(i) ☐ Recommended to me by a health professional (please circle who)
Medical specialist GP Physiotherapist Nurse Other (please specify) _____

(ii) ☐ Advertising (please circle where)
Community newspaper Flyer Radio TV the Internet Other _____

(iii) ☐ Recommended to me by friends or family

(iv) ☐ Other (please specify)_____

A2. What were the main reasons that motivated you to first do Taoist Tai Chi™? (Tick all that apply)

☐ curiosity
☐ for the physical health benefits
☐ for the psychological health benefits
☐ to relieve boredom
☐ encouraged by friends or family
☐ other (please specify)_____
☐ for the exercise
☐ for the relaxation
☐ to improve energy levels
☐ to provide a social interest
☐ to improve well-being or fitness

A3. At what WA branch do, or did, you *usually* practise Taoist Tai Chi™?

_____

A4. Are you currently: (Tick all that apply)

☐ attending beginners classes
☐ an instructor
☐ practising a different style of tai chi
☐ attending continuing classes
☐ not attending classes but still practising Taoist Tai Chi™
☐ not attending classes and not practising Taoist Tai Chi™

If you have practised tai chi in the last six months, please answer the following questions;

If not, please go to A15

A5. How frequently do/did you *generally* practise Taoist Tai Chi™?

☐ every day ☐ more than three times a week (but not every day) ☐ three times a week
☐ twice a week ☐ once a week ☐ once every two or three weeks ☐ once a month or less

A6. How frequently do/did you typically attend tai chi classes *per week*?

☐ once ☐ twice ☐ three times ☐ more than three time

A7. How much time do/did you typically spend on practising tai chi *during* classes?

☐ <15mins ☐ 15- 30 mins ☐ 31-60mins ☐ 60-90mins ☐ >90mins

A8. *If* you practise tai chi outside of classes, how much time do/did you *typically* spend on one occasion?

☐ <15mins ☐ 15- 30 mins ☐ 31-60mins ☐ 60-90mins ☐ >90mins

A9. What is/was the average *total* amount of time *per week* that you would spend practising tai chi, including during and outside of classes?

☐ < 1hour ☐ 1-2 hours ☐ 2-5 hours ☐ >5 hours

A10. At what time of day do/did you *usually* practise Taoist Tai Chi™? (please tick *one* of them)

☐ morning ☐ afternoon ☐ evening/night ☐ time varies

A11. How do/did you *normally* practise Taoist Tai Chi™? (please tick *one* of them)

☐ with other tai chi society members ☐ with friends ☐ by myself

A12. Where do/did you *normally* practise Taoist Tai Chi™? (please tick *one* of them)

☐ at the club rooms ☐ at home ☐ in a public place ☐ other (please specify)_____

A13. Which other forms of Taoist Tai Chi Arts of Health do/did you practise and how often?

Rarely = less than once per month; **Occasionally**= at least once a month;
Regularly= about once a week; **Frequently** = usually more than once a week

Taoist Tai Chi Arts of Health	Frequency of Practise (*please circle for each forms*)				
Meditation	never	rarely	occasionally	regularly	frequently
Chanting	never	rarely	occasionally	regularly	frequently
Health recovery program	never	rarely	occasionally	regularly	frequently
Sword	never	rarely	occasionally	regularly	frequently
Sabre	never	rarely	occasionally	regularly	frequently
Lok Hup	never	rarely	occasionally	regularly	frequently

A14. Do/did you usually attend:

National workshops ☐ never ☐ every second year or less ☐ every year

International workshops ☐ never ☐ every second year or less ☐ every year

Club social functions ☐ never ☐ rarely ☐ occasionally ☐ regularly ☐ frequently

A15. Could you please indicate what services you have volunteered, or still do volunteer, to your local branch? (Tick all that apply)

- ☐ Office bearer or committee member
- ☐ Instructor---Beginner's class
- ☐ Instructor—continuing class
- ☐ Fundraising
- ☐ Club housekeeping or maintenance
- ☐ Administrative help
- ☐ Organising social activities
- ☐ Organising /helping with workshops
- ☐ Other (please specify)_____
- ☐ Do not volunteer

A16. In which year did you first commence Taoist Tai Chi™ ? _____

A17. How many times have you attended a Beginner's course?

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ more than 5

A18. If you attended more than one beginner's course, What was the reason?

_____

A19. After your first Beginner's course, did you still continue to practise Taoist Tai Chi™?

☐ Yes–go to ***A20*** ☐ No—go to ***A21***

A20. If yes, why do you attend continuing classes? (Tick all that apply)

- ☐ Enjoyment
- ☐ Social contact
- ☐ To gain more positive health benefits
- ☐ Reduce stress and anxiety levels
- ☐ To continue improving my tai chi
- ☐ Fills in the time
- ☐ Because it feels good
- ☐ Others (please specify) _____

_____

A21. If not, why did you give it up? (Tick all that apply)

- ☐ Illness
- ☐ Too physically demanding
- ☐ Transportation problem
- ☐ No time
- ☐ Lost interest
- ☐ Too difficult
- ☐ Didn't meet my expectations
- ☐ Other (please specify)_____

_____

_____

A22. Please tell us what being a member of the Taoist Tai Chi Society means to you (Please circle the most appropriate number for *each statement*).

	Being a member of my local Taoist Tai Chi club gives me a sense of:	Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree
1	feeling at home	1	2	3	4	5	6
2	being supported	1	2	3	4	5	6
3	being safe	1	2	3	4	5	6
4	being encouraged	1	2	3	4	5	6
5	being among friends	1	2	3	4	5	6
6	being motivated to help others	1	2	3	4	5	6

A23. Please tell us your beliefs about tai chi *in general* (Please circle the most appropriate number for *each statement*).

	I believe tai chi:	Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree
1.	is a safe exercise	1	2	3	4	5	6
2.	is enjoyable	1	2	3	4	5	6
3.	is easy to learn	1	2	3	4	5	6
4.	is beneficial for physical health	1	2	3	4	5	6
5.	helps physical relaxation	1	2	3	4	5	6
6.	reduces pain	1	2	3	4	5	6
7.	is beneficial for mental health	1	2	3	4	5	6
8.	helps mental relaxation	1	2	3	4	5	6
9.	helps reduce stress	1	2	3	4	5	6
10.	helps reduce anxiety	1	2	3	4	5	6
11.	provides a social network	1	2	3	4	5	6
12.	improves concentration	1	2	3	4	5	6
13.	improves energy	1	2	3	4	5	6
14.	improves confidence in getting around	1	2	3	4	5	6
15.	improves confidence in performing everyday activities	1	2	3	4	5	6
16.	helps people handle complex tasks better	1	2	3	4	5	6
17.	improves spiritual health	1	2	3	4	5	6
18.	assists people to be more responsible for their own health	1	2	3	4	5	6

Section B
Some questions about your health

B1. In general, how would you rate your health *prior to starting* Taoist Tai Chi™? (Please rate the quality of health status on the scale below)

1	2	3	4	5	6
Very poor	poor	fair	good	very good	excellent

B2. In general, how would you rate your health *since starting* Taoist Tai Chi™? (Please rate the quality of health status on the scale below)

1	2	3	4	5	6
Very poor	poor	fair	good	very good	excellent

B3. What is your height?

___cm *OR* ___ft___inches

B4. What is your current weight?

___kg *OR* ___stones___lbs

B5. Have you ever had any of the following chronic health problems *diagnosed* by a health professional?

(Tick all that apply)

- ☐ Hypertension (Raised blood pressure)
- ☐ Cardiovascular disease (Heart problem) (please specify) _____
- ☐ Arthritis (specify osteoarthritis *OR* rheumatoid arthritis) _____
- ☐ Diabetes (specify Type 1 *OR* Type 2)_____
- ☐ Asthma
- ☐ Lung disease (please specify) _____
- ☐ Musculoskeletal disease (please specify) _____
- ☐ Anxiety
- ☐ Depression
- ☐ Any other mental health problem (please specify) _____
- ☐ A history of falling or nearly falling
- ☐ Cancer (please specify) _____
- ☐ Any other chronic medical condition or health problem not mentioned above (please specify)

_____

_____

If you have not ticked any boxes in B5, please go to question B7

B6. This question should ***ONLY*** be completed by people who currently have ***ANY diagnosed chronic medical condition*** such as outlined in Question B5. (people WITHOUT a chronic medical condition please complete question B7 instead).

The following question makes statements about your health with which you may agree or disagree. Please circle ***ONLY ONE*** number for each statement.

		Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree
1	If my condition worsens, it is my own behavior which determines how soon I will feel better again.	1	2	3	4	5	6
2	As to my condition, what will be will be.	1	2	3	4	5	6
3	If I see my doctor regularly, I am less likely to have problems with my condition.	1	2	3	4	5	6
4	Most things that affect my condition happen to me by chance.	1	2	3	4	5	6
5	Whenever my condition worsens, I should consult a medically trained professional.	1	2	3	4	5	6
6	I am directly responsible for my condition getting better or worse.	1	2	3	4	5	6
7	Other people play a big role in whether my condition improves, stays the same, or gets worse.	1	2	3	4	5	6
8	Whatever goes wrong with my condition is my own fault.	1	2	3	4	5	6
9	Luck plays a big part in determining how my condition improves.	1	2	3	4	5	6
10	In order for my condition to improve, it is up to other people to see that the right things happen.	1	2	3	4	5	6
11	Whatever improvement occurs with my condition is largely a matter of good fortune.	1	2	3	4	5	6
12	The main thing which affects my condition is what I myself do.	1	2	3	4	5	6
13	I deserve the credit when my condition improves and the blame when it gets worse.	1	2	3	4	5	6
14	Following doctor's orders to the letter is the best way to keep my condition from getting any worse.	1	2	3	4	5	6
15	If my condition worsens, it's a matter of fate.	1	2	3	4	5	6
16	If I am lucky, my condition will get better.	1	2	3	4	5	6
17	If my condition takes a turn for the worse, it is because I have not been taking proper care of myself.	1	2	3	4	5	6
18	The type of help I receive from other people determines how soon my condition improves.	1	2	3	4	5	6

The Form C of the MHLC scales used with permission: http://www.vanderbilt.edu/nursing/kwalliston/mhlcscales.htm

B7. This question is to be completed by people *WITHOUT* a current diagnosed chronic medical condition, such as outlined in Question B5.

Please circle *ONLY ONE* number for each statement.

		Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree
1	If I get sick, it is my own behaviour which determines how soon I get well again.	1	2	3	4	5	6
2	No matter what I do, if I am going to get sick, I will get sick.	1	2	3	4	5	6
3	Having regular contact with my physician is the best way for me to avoid illness.	1	2	3	4	5	6
4	Most things that affect my health happen to me by accident.	1	2	3	4	5	6
5	Whenever I don't feel well, I should consult a medically trained professional.	1	2	3	4	5	6
6	I am in control of my health.	1	2	3	4	5	6
7	My family has a lot to do with my becoming sick or staying healthy.	1	2	3	4	5	6
8	When I get sick, I am to blame.	1	2	3	4	5	6
9	Luck plays a big part in determining how soon I will recover from an illness.	1	2	3	4	5	6
10	Health professionals control my health.	1	2	3	4	5	6
11	My good health is largely a matter of good fortune.	1	2	3	4	5	6
12	The main thing which affects my health is what I myself do.	1	2	3	4	5	6
13	If I take care of myself, I can avoid illness.	1	2	3	4	5	6
14	Whenever I recover from an illness, it's usually because other people (*for example, doctors, nurses, family, friends*) have been taking good care of me.	1	2	3	4	5	6
15	No matter what I do, I 'm likely to get sick.	1	2	3	4	5	6
16	If it's meant to be, I will stay healthy.	1	2	3	4	5	6
17	If I take the right actions, I can stay healthy.	1	2	3	4	5	6
18	Regarding my health, I can only do what my doctor tells me to do.	1	2	3	4	5	6

The Form A of the MHLC scales used with permission: http://www.vanderbilt.edu/nursing/kwalston/mhlcscales.htm

Section C

General Information

C1. How old are you? ____years

C2. What is your gender? ☐ Male ☐ Female

C3. In which country were you born?

_____

C4. How would you describe yourself?

☐ Caucasian ☐ Asian ☐ Indigenous Australian

☐ Other (please specify)_____

C5. What is the highest educational level attained?

☐ No formal education

☐ Year 1-8

☐ Year 9-11

☐ Year 12 or TAFE

☐ Undergraduate university qualification

☐ Postgraduate university qualification

C6. What is your current marital/relationship status?

☐ Married ☐ Living with a partner/de facto ☐ Widowed

☐ Divorced ☐ Separated ☐ Single

C7. What is your employment status:

☐ Full time ☐ Part time ☐ Casual ☐ Retired ☐ Unemployed ☐ Student

C8. Which income bracket best describes your household?

☐ $0 - $6,000 per year

☐ $6,001 - $35,000 per year

☐ $35,001 - $80,000 per year

☐ $80,001 - $180,000 per year

☐ $180,001 and over

Murdoch UNIVERSITY

Your comments about tai chi www.murdoch.edu.au

D1. What were your main expectations when you first began practising Taoist Tai Chi™?

D2. Please describe the ***three*** (3) main benefits you have experienced as a result of doing Taoist Tai Chi™

D3. Please describe any unanticipated benefits you receive (or have received) from doing Taoist Tai Chi™

Murdoch
UNIVERSITY

Your comments about tai chi

D4. Please describe anything which may have discouraged you from doing Taoist Tai Chi™

THE END

THANK YOU FOR YOUR PARTICIPATION IN THIS STUDY

IF YOU WISH TO PARTICIPATE IN THE DRAW FOR THE CASH PRIZE
OR
IF YOU WISH TO RECEIVE A PERSONAL COPY OF THIS STUDY'S FUNDINGS
PLEASE COMPLETE YOUR DETAILS OVER PAGE

(Your details will be kept separately from this survey
and all your data will remain anonymous)

CRICOS Provider Code: 00125J
ABN: 61 616 369 313

Appendix E: Personal Information

Murdoch UNIVERSITY

Personal Information

www.murdoch.edu.au

I wish to be part of the draw for the cash prize. ☐ Yes ☐ No

(You will only be contacted if you are the winner)

Name: _____

Address: _____

_____

_____

Phone: _____

Email: _____

Following completion of the study a summary of the findings will be available at all WA branches of the Taoist Tai Chi Society and on the Murdoch University School of Nursing and Midwifery's web-site. However should you wish to be sent a personal copy of the summary of the study's findings, please complete the required details below.

I wish to receive a personal copy of the summary of the study's findings

☐ Yes

☐ No

Name: _____

Address: _____

_____

_____

Phone: _____

Email: _____

CRICOS Provider Code: 00125J
ABN 61 616 369 313

Appendix F: Poster

Please help us with our research into

If you have received a research questionnaire

in the post

Please complete and return in the reply paid envelope

before 15th December

and

Go into the draw to win a $150 cash prize

If you haven't received a questionnaire but would like to complete one, please ask your instructor or contact one of the researchers:
Mrs Li Wei on 0422 561 734 or
Dr Cathy Fetherston on 9582 5516

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